# DOCUMENT RESUME

ED 236 087 SO 015 077

| | |
|---|---|
| TITLE | Environmental Education: A Sourcebook for Secondary Education. |
| INSTITUTION | Curriculum Development Centre, Canberra (Australia). |
| REPORT NO | ISBN-0-642-96215-4 |
| PUB DATE | Dec 81 |
| NOTE | 196p.; For a related document, see SO 015 076. Several pages may be marginally legible due to small print. Photographs may not reproduce clearly. |
| AVAILABLE FROM | Curriculum Development Centre, P.O. Box 52, Dickson A.C.T. 2602, Australia ($19.75). |
| PUB TYPE | Guides - Classroom Use - Guides (For Teachers) (052) -- Collected Works - General (020) |
| EDRS PRICE | MF01/PC08 Plus Postage. |
| DESCRIPTORS | *Class Activities; Controversial Issues (Course Content); *Curriculum Development; Dramatic Play; *Environmental Education; Field Studies; Integrated Curriculum; Language Arts; Learning Activities; *Local Issues; School Community Relationship; School Policy; Secondary Education; Simulated Environment; *Urban Environment; Values |
| IDENTIFIERS | Environmental Attitudes; Environmental Awareness; *Environmental Concepts |

ABSTRACT

Arranged in three sections, the book offers practical techniques for introducing environmental education at the secondary level. The first section, on planning, outlines a conceptual framework for environmental education, discusses development of school policy on environmental education, provides approaches to controversial and values issues, presents ways for developing school grounds for environmental education, and describes an environment week festival. The second section, arranged in three parts, gives examples of ways in which environmental education has been and can be implemented in school programs. Topics focus on discussing language development as the major means by which we make meaning of our environment, integrating the humanities and home economics in environmental education, and using drama, games, and simulations in environmental education programs. Part 2 emphasizes urban studies and studying and interacting with the local urban environment. Specific activities involving community action are described. Part 3 focuses on the implementation of environmental education in the field through school camps and field study centers and gives examples of possible junior-secondary outdoor activities. (LH)

***********************************************************************
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
***********************************************************************

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

✓ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
B. Christenson

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

ED236087

**Environmental Education Project**

# ENVIRONMENTAL EDUCATION:
# A Sourcebook for Secondary Education

SO 015 077

Curriculum Development Centre
Canberra Australia

*Published in December, 1981 by*
*The Curriculum Development Centre, Canberra, Australia*
*P.O. Box 52, Dickson, A.C.T. 2602*
*Copyright © Curriculum Development Centre, 1981*
*National Library of Australia Card No. & ISBN 0 642 96215 4*
*Designed and produced by Peacock Publications,*
*207 Glen Osmond Road, Frewville, South Australia 5063*
*Typeset and printed in Australia*

# *ABOUT THE ENVIRONMENTAL EDUCATION PROJECT*

---

**Acknowledgements**

The Centre wishes to thank all those who have given their time, thought and effort to the Environmental Education Project.

**Project Personnel**

*Co-ordinator:* Annette Greenall
*Director:* John H. Smith
*Liaison Officers:* Jim Cameron (Northern Territory)
Grant Godfrey (Tasmania)
Frank Haddon (New South Wales)
Peter Hobbs (Australian Capital Territory)
Harry Pearson (Western Australia)
Lester Russell (South Australia)
Bob Stevenson (Queensland)
Jim Wilson (Victoria)
*Advisory Committee:* Bruce Lavender (Australian Teachers' Federation)
Chris Makepeace (Curriculum Development Centre)
Harry Pearson (Western Australia)
Bob Stevenson (Queensland)
David Stokes (State College of Victoria—Rusden)
Jim Wilson (Victoria)

**Publications**

- *Environmental Education: A Sourcebook for Primary Education* (readings and case studies for teachers)
- *Environmental Education : A Sourcebook for Secondary Education* (readings and case studies for teachers in a number of subject areas)
- *Exploring Outdoors* (activities for students with teachers' notes)
- *Streets* (activities for teachers with students' notes)
- *Walmit Divided* (a planning simulation)

**Further Information**

If you would like further information about other publications from this project or other CDC Projects in the area of environmental education please contact:

Annette Greenall
Co-ordinator,
Environmental Education,
Curriculum Development Centre,
PO Box 52, Dickson, ACT, 2602

**Other CDC Environmental Education Publications**

- *Development of Environmental Education in Australia—Key Issues*
- *Education and the Human Environment*
- *Environmental Education for Schools*
- *Habitat: human settlements for the future*
- *Investigating the National Estate*
- *A Report of the Belgrade Conference on Environmental Education*
- *Report on the Curriculum Development Centre Study Group on Environmental Education June 1977.*

# FOREWORD

---

The publications from the Curriculum Development Centre's Environmental Education Project are the result of the developmental work of a number of people around Australia. The project itself was established in 1978 as one of the responses to the recommendations for action proposed by a Study Group on Environmental Education sponsored by the Centre. A Project Director was made available on secondment from the Education Department of South Australia, and all other States and Territories nominated a Liaison Officer to be responsible for the project's network activities. The co-operative nature of the project is further demonstrated by the involvement of a lecturer from a teacher training institution and a nominee from the Australian Teachers' Federation on the Advisory Committee.

The materials themselves were developed by teachers to whom small-scale grants were made for the description of activities which contribute to the Centre's view of environmental education. This view, which is the basis of all CDC projects in this program area, is stated as more than just developing knowledge about the environment and skills to investigate it. Environmental education involves developing a concern for the environment, developing a willingness to take responsible action to improve the quality of life, and accepting responsibility for environmental management. Although some of the papers in this volume may not reflect all of these aims, they do illustrate the range of activities that are being undertaken in Australian schools in the name of environmental education and thus they fulfil one of the aims of the project.

In addition to the grant materials, some commissioned accounts were arranged. The resulting descriptions and analyses of activities passed through a range of trialling, vetting and editing services which involved teachers, the Advisory Committee, the State Liaison Officer network and the management procedures convened by the Centre. Thus the materials have been developed in response to classroom needs and with a view to bringing about qualitative improvement to learning in environmental education through the provision of trialled and modified resources. They are in the tradition of the Social Education Materials Project (SEMP)—among which there are some related materials—and they have strong associations with the recently published resources on *Investigating the National Estate*.

We hope that teachers around Australia will find the Environmental Education Project materials useful directly in their classrooms and as exemplars for adaptation to their local situation.

D. FRANCIS
Acting Director

# CONTENTS

About the Environmental Education Project iii
Foreword v
Introduction 1

## Section 1 Planning for Environmental Education

An Introduction to Environmental Education *Annette Greenall* 4
Environmental Education: A Conceptual Framework *Jon Womersley & David Stokes* 8
Developing a School Policy on Environmental Education *Bob Stevenson* 19
Approaches to Controversial and Values Issues in Environmental Education *Kevin Blachford* 26
Developing Schoolgrounds for Environmental Education *John H. Smith & Jim Wilson* 36
The Environment Week Festival at Princes Hill High School, 1978 *John Stirling* 47

## Section 2 Implementing Environmental Education

### A In the Classroom

Language Development and Environmental Education *Bernie Higgs* 57
Humanity and the Environment—An Integrated Approach *Sylvia Walton* 61
Environmental Education and the Home Economics Teacher *Noel Gough* 71
Dance/Drama and Environmental Education *Molly Hall* 86
Using Simulations and Games in the Classroom *R. Herschell, J. Hodgkinson, & J. Fein* 108
Environmental Impact Study *David Kopelke* 112
Walmit Divided *John Walker & Jim Mitchell* 121

### B In the Local Area

Studying the Local Urban Environment *Ian Rule* 122
Interaction with the Local Environment: A Program for Year 11 Students *Denise Kennedy* 131
Educational Use of an Urban Creek *Steve Malcolm* 137

## C In the Field

An Integrated Field Study in a Contrasting Environment *Warren L. Pollard* 151
Developing a School Field Study Centre *Jean Whimp* 157
Junior Secondary Outdoor Activities *Jean Whimp* 167

# *INTRODUCTION*

This set of readings and case studies is one of a series of publications from the Centre's Environmental Education Project. There are two publications for secondary level, the *Sourcebook for Secondary Education* and *Walmit Divided*. There are three separate publications for the primary level (see 'About the Environmental Education Project' on page iii).

The materials in all these publications have been written by teachers and curriculum consultants from around Australia. Many of the papers describe the teachers' own programs. Others describe the author's position or point of view on his or her particular topic.

The *Sourcebook for Secondary Education* contains papers which examine various issues in, and means of, planning for environmental education. It also includes articles on its implementation across the curriculum.

Planning for environmental education involves consideration of many conceptual and organisational issues. Firstly, what is environmental education and what should be the aims of an environmental education program? Annette Greenall from the Curriculum Development Centre looks at these questions in her paper *An Introduction to Environmental Education*. Once the aims have been established the next step is to look at how these can be incorporated into policy and curriculum planning. In this context, Jon Womersley (from the South Australian Department of Environment and Planning) and David Stokes (from State College of Victoria — Rusden) outline *A Conceptual Framework* for environmental education and Bob Stevenson (from the Queensland Department of Education) gives guidelines for a secondary school in *Developing a School Policy on Environmental Education*.

Much environmental education involves discussions and being involved in controversial issues. In his paper Kevin Blachford looks at *Approaches to Controversial and Values Issues in Environmental Education* from his particular viewpoint.

School buildings and school grounds are important considerations in planning environmental education policies and programs. In the Primary Sourcebook, Andrew Tidswell's article, *Guideline for Schools*, looks at the ways in which the functioning of buildings can be used to reinforce and complement classroom programs as well as demonstrating to the community the school's environmental awareness. School grounds should be an integral part of a school's environmental education program and in their article in this Sourcebook John Smith and Jim Wilson outline the major planning steps and features to be considered in *Developing Schoolgrounds for Environmental Education*.

Environmental education programs can be developed in a number of guises. This volume contains examples of across the curriculum, specific subject areas and outdoor programs, and special events — such as John Stirling's *Environment Week Festival* at his school (Princes Hill High School, Victoria).

The remaining papers in this volume give examples of ways in which environmental education has been, and can be, implemented in school programs.

Firstly, in the section, 'In the Classroom', Bernie Higgs puts forward his personal perspective on *Language Development and Environmental Education*. In this paper he proposed the adoption of 'exploratory talk' for environmental education as he believes that language is the major means by which we make meaning of our environment. Sylvia Walton describes the *Humanity and the Environment* course at Eltham College, Victoria. This course draws on the descriptions of history,

8

geography and social science as well as having close ties with the language curriculum.

In his paper Noel Gough (from State College of Victoria — Rusden) discussed the relationship between *Environmental Education and the Home Economics Teacher*. He argues that home economics teachers should be involved in a variety of areas of environmental education and outlines a number of student activities to do this. Molly Hall's *Dance, Drama and Environmental Education* gives many examples of ways by which dance and drama can be used to heighten children's experiences of their environment.

Simulations and games have an important role in developing understanding of complex problems and issues. Herschell, Hodgkinson and Fien (from the Queensland Department of Education) have outlined their views on the *Use of Simulations and Games* as an introduction to two simulations. David Kopelke (from Boyne Island Field Study Centre in Queensland) describes his *Environmental Impact Study* which is a simulation exercise based on an actual example — the location of an aluminium smelter on Boyne Island near Gladstone. This is an interesting example of teaching and methodology. A second simulation, *Walmit Divided*, has been developed by John Walker and Jim Mitchell (from Canberra College of Advanced Education). Walmit is a hypothetical township somewhere in Australia and its citizens are faced by a number of situations. *Walmit Divided* has been published separately by the Curriculum Development Centre.

Most Australians live in cities but until recently urban studies had not been seen as part of environmental education. The three articles in the section, 'In the Local Area', are aimed at emphasising the importance of the local, and urban, area for environmental studies. Firstly, Ian Rule describes his Year 10 program, *Studying the Local Urban Environment*, which traced the evolution of a suburban area of Melbourne. The second example, again from Melbourne, this time Cleeland High School, is Denise Kennedy's Year 11 program *Interaction with the Local Environment*. This program made use of an area adjacent to the school to develop students' awareness of the environment and an informed commitment to its enhancement. Stephen Malcolm then describes his program which made *Educational Use of an Urban Creek* at Fairhills High School, also in Melbourne. This program was exciting in that it involved community action — producing a plan for the creek for the local authorities, enlisting public support and increasing community awareness.

Implementing environmental education 'In the Field' can be through school camps — such as Warren Pollard's description of Cobar High School's *Integrated Field Study in A Contrasting Environment* — and field study centres — such as Jean Whimp's case study *Developing a School Field Study Centre* at Para Wirra in South Australia. The activities from Para Wirra are described in the paper on *Junior Secondary Outdoor Activities*.

Environmental education is a broad area and the publications from the Environment Education Project cover many but not all of the facets. As well as reading the papers in this volume it is strongly recommended that you look at the primary level publications. Many of the ideas and activities contained in these publications are equally appropriate for secondary level.

# SECTION

# 1

## *PLANNING FOR ENVIRONMENTAL EDUCATION*

# AN INTRODUCTION TO ENVIRONMENTAL EDUCATION

*Annette Greenall*

---

This introduction has three aims—to examine the meaning of environmental education and its aims, to look at how environmental education has evolved in Australian school curricula and to give a brief history of Curriculum Development Centre involvement in environmental education.

**What is environmental education?**

The definition put forward ten years ago by the International Union for the Conservation of Nature and Natural Resources is still relevant:

> Environmental education is the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality.[1]

This definition indicates that environmental education is much more than teaching about the environment, in the environment or from the environment. Environmental education is concerned with developing attitudes, providing opportunities for practice in decision making and making informed decisions about the environment.

The aims of the environmental education have been refined at successive international meetings and early in 1980 the Curriculum Development Centre included the following set of aims in its document *Environmental Education for Schools.*[2]

- to help students acquire an *awareness* of and *sensitivity* to the total environment
- to help students develop a basic *understanding* of the total environment and the interrelationships of man and the environment
- to help students develop the *skills* necessary for investigating the total environment and for identifying and solving environmental problems
- to help students acquire social values and strong *feelings of concern* for the environment
- to help students acquire the *motivation for actively participating* in environmental improvement and protection
- to help students *identify alternative approaches* and *make informed* decisions about the environment based on ecological, political, economic, social and aesthetic factors
- to provide students with *opportunities to be actively involved* at all levels in working towards the resolution of environmental problems

These aims cannot be achieved through any one subject or discipline area. Rather, their achievement will involve all students and all subject areas at all levels. *Environmental education is an orientation in the curriculum* or 'the impregnation of our education by the subject matter, principles, methods and spirit of environmental education'.

We can talk about education *in* the environment, education *about* the environment, education *from* the environment and education *for* the environment, but only the last can be called environmental education.

Education *in* the environment can take the form of the environment as a classroom location or—through discipline studies such as history, geography, art, science, drama, music, mathematics—the environment can be the place where knowledge about the skills to investigate the environment can be acquired, feelings of concern for the environment can be developed, and active participation in environmental improvement and protection can take place.

Education *about* the environment seeks to discover the nature of a study area mainly in the form of knowledge (information) about the particular environment.

Education *from* the environment uses the environment as a resource either as something to

11

be investigated where inquiry skills are developed or as a source of material for realistic activities in language, history, science, mathematics, craft and other subject areas.

Education *for* the environment seeks to develop student's informed concern for, and responsibility towards, the environment through activities aimed at developing values which affect behaviour and lead to the development of a personal environmental ethic. Education for the environment involves educating students so that their actions and influence on collective community action will be positively for the benefit of the environment.

Education about, from and for the environment can take place within the school classroom or outdoors, around the school buildings, in the school grounds or local area, at shopping centres or historic buildings, at the beach or river, or 'in the wild'. Education about and from the environment involves the acquisition of knowledge and the development of skills which are important bases for environmental education—but it is only when education *for* the environment is the intention that environmental education is actually taking place and the aims given above have a possibility of being achieved.

Environmental education is more than just developing knowledge about the environment and skills to investigate the environment. Environmental education involves developing a concern for the environment, developing a willingness to take responsible action to improve the quality of life, and accepting responsibility for environmental management.

### Environmental education in Australian schools

Environmental education in Australian schools could be said to have its origins in nature study in primary schools, in ecology and geography feed studies in secondary schools and through the school camps movement. Allen Strom has recently given his viewpoint on this development in New South Wales[3] as has Alan Reid for Victoria.[4]

During the seventies, as part of the growth of social studies in schools, the growing awareness of science in society, and the realisation of the importance of studying local history and geography, environmental studies of various forms came to be part of the curriculum in many Australian schools. Many of these programs have been more concerned with education in the environment (experiences outside the classroom) or increasing the amount of teaching about the environment (the environmental content of programs) than with involving students in social action and decision making programs but the overall aim has been with increasing the general awareness of our surroundings and our interrelationships with them.

The environmental component of science programs has, until recently, been mainly concerned with teaching about the environment and the interrelationships within it rather than with developing concern for the environment. Fensham and May have argued for environmental education as an aim of core curriculum and have related this to science education with an emphasis on education for the environment.[5] (Environmental studies is one of the nine essential areas of knowledge and experience in the Curriculum Development Centre's core curriculum document *Core Curriculum for Australian Schools*.[6] This is discussed in greater detail below.)

Geography, because of its emphasis on man-land relationships has been well placed to handle this part of environmental education. Social studies are involved in environmental education through values education and the study of social issues. Drama has a role in environmental education in raising environmental consciousness through role-playing activities.

One of the aims of the CDC's Environmental Education Project has been to support the development of some position papers and descriptive evaluations of various types of environmental education occurring in Australian schools. These were envisaged as including whole school and year long programs, examples of community involvement programs, field excursions, environmental problem projects, urban trails and classroom programs. Examples of many of these are included in this volume and although many of the articles describe programs or activities that have an education in or about the environment component most have the potential for becoming education for the environment and thus working towards achieving the aims of environmental education.

### Environmental Education at the Curriculum Development Centre

Environmental education has been a priority area for the CDC since its inception in 1973. The issue was to determine the sort of assistance that was needed for the development of environmental education in Australian schools.

The growing world wide concern about the environmental crisis in the late sixties stimulated the Australian Academy of Science to convene a national conference in April 1970 on the theme 'Education and the Environmental Crisis'.[7] At this time there were some conservation education programs in primary schools in each State but no specific programs for environmental education in secondary schools or teacher training courses.

In 1973-74 Linke[8] reviewed some of the major developments in environmental education in Australia and overseas. Although there were activities underway that could be called environmental education he concluded that there was a lack of co-ordination among the many institutions and agencies involved in different aspects of environmental education.

At this time Reid was also surveying the environmental education scene as part of his study of opportunities for Australian Government involvement in environmental education.[9] In his report he suggested that the Government could develop a national plan, a resource centre services by State and Commonwealth instrumentalities, and a regional network of centres staffed by schools' and community co-ordinators.

These reports, together with a CDC 'Survey of Needs for Environmental Education in Australia'[10] formed the background for the CDC Environmental Education Committee which was established in late 1974 under the chairmanship of Russell Linke. The interim report from this Committee was discussed at the 1975 Australian National Commission for Unesco Seminar on Education and the Human Environist.[11]

Although not acted upon, the report of this Committee did provide an essential base for the deliberations of the CDC Study Group on Environmental Education which was established late in 1976 under the chairmanship of Peter Fensham. It is the recommendations from this Committee[12] which form the basis of the CDC's environmental education program.

*Environmental Education for Schools,*[13] a set of a booklet and two posters, was a joint project between CDC and the Department of Environment, Housing and Community Development (now Department of Science and the Environment) to encourage the general acceptance of the place and significance of education concerning the environment and some of its general features by teachers in many different types of classrooms.

*Investigating the National Estate,*[14] a kit of resource materials on Australia's heritage, was a joint project of CDC and the Australian Heritage Commission which aimed to heighten awareness of Australia's heritage, suggest criteria for deciding what should be part of our heritage, and to assist in the development of skills for identifying what should be on the Register of the National Estate.

The third component of the program was this Environmental Education Project. This project has resulted in the development of a number of articles and manuscripts which are being published by the CDC for primary and secondary school teachers during 1980 and 1981.

## The Future

The future challenge for environmental education at the Curriculum Development Centre is in relation to the core curriculum. As mentioned earlier, environmental studies is one of the nine areas of the core curriculum outlined by the Centre. The central purpose of environmental studies within the core is awareness and understanding of both the physical and man-made environments and sensitivity to the forces that sustain or may destroy them. This requires both systematic knowledge drawn from such disciplines as biology, geography, landscape architecture, economics, etc., and a readiness by schools to participate in environmental maintenance projects which give students practical experience in the field. As in other areas of the core, there is an emphasis on social action—environmental studies represents a blend of theory and practice which may be organised in many different ways. Within the core, what is important is not the particular kind of organisation, but the environmentalist approach or perspective. This is an amalgam of types of knowledge and understanding, and a disposition to sustain and protect the environment.[15]

As described in this paragraph, environmental education is interpreted as being an environmentalist approach or perspective across the curriculum, involving education in, about and for the environment. Indeed, social action is seen as an important part of the area.

The core learning processes are closely related to environmental education.[16] Learning and thinking techniques such as problem-solving, lateral thinking, systematic recording of data, reaching decisions and making judgments are an important part of environmental education. The development of interpersonal and group relationships through group work and field trips; practical performances; using a variety of forms of expression; developing skills and abilities—such as reading, elementary statistics, use of tools and organising and completing learning tasks—and developing dispositions and values such as regard for others are also important components of environmental education.

Thus the environmental studies area of the core curriculum together with the core learning processes, is concerned with meeting all the aims for environmental education noted earlier. The challenge is to relate these aims to the core curriculum and its implementation at all levels in Australian schools. Some of the following papers may help provide guidelines for this development.

## Notes

1. IUCN definition cited in Carson, S.McB. *Environmental Studies: the Construction of an 'A' level Syllabus,* NFER, Slough, U.K., 1971, page 78.
2. Greenall, A. *Environmental Education for Schools,* Curriculum Development Centre, Canberra, 1980.
3. Strom, A. A. 'The Development of Environmental Education', *Australian Association for Environmental Education Newsletter 2* (July 1980), pp. 4-5.
4. Reid, A. J. 'The Essence of Environmental Education', *Australian Association for Environmental Education Newsletter 1* (April 1980), pp. 3-6.
5. Fensham, P. J. & May, J. B. 'Servant not Master—A New Role for Science in a Core of Environmental Education', *Australian Science Teachers Journal 25,* 2 (1979), pp. 15-24.
6. Curriculum Development Centre *Core Curriculum for Australian Schools,* Curriculum Development Centre, Canberra, 1980.
7. Evans, J. & Boyden, S. (eds), *Education and the Environmental Crisis,* Australian Academy of Science, Canberra, 1970.
8. Linke, R. D. *Environmental Education in Australia,* Allen and Unwin, Sydney, 1980.
9. Reid, A. J., *A Preliminary Study of Opportunities for Australian Government Involvement in Environmental Education in Australia,* report submitted to the Australian Minister for the Environment and Conservation, Canberra, June 1974.
10. See Greenall, A. E., and Womersley, J. C. (eds), *Development of Environmental Education in Australia—Key Issues,* Curriculum Development Centre, Canberra, 1977.
11. Linke, R. D., (ed.), *Education and the Human Environment*—Unesco Seminar Report, Curriculum Development Centre, Canberra, 1977.
12. *Report of the Curriculum Development Centre Study Group on Environmental Education,* Curriculum Development Centre, Canberra, 1977.
13. Greenall, 1980.
14. *Investigating the National Estate,* Curriculum Development Centre, Canberra, 1980.
15. Curriculum Development Centre, 1980, p. 18.
16. Curriculum Development Centre, 1980, p. 16.

# *ENVIRONMENTAL EDUCATION: A CONCEPTUAL FRAMEWORK*

*Jon Womersley*
*David Stokes*

---

## PREAMBLE

After briefly outlining the history and purpose of environmental education the authors outline a conceptual framework by which the aims, objectives and guiding principles of environmental education can be translated into an effective teaching/learning program. The three dimensions of the framework—*objectives, content* and *learning situations*—are discussed in detail by focusing on the questions 'What is the content of environmental education?' and 'How should that content be organised?'. Answers to these questions identify the major issues of classroom management. The subsidiary questions 'Is environmental education different?' and 'Who should teach it?' raise questions concerning the relationship of environmental education within the total curriculum, and identify aspects of school administration that need to be considered if valid programs of environmental education are to be implemented. Underlying all aspects of the paper is the authors' strongly held view that environmental education is a process of thinking and knowing about the world around us and so is concerned with awareness and knowledge of the environment, the development of attitudes towards it and skills to appreciate and understand it, and with being involved at all levels in its improvement and protection. This view, in varying degree, is shared by all other contributors to this handbook.

---

Teaching about, in and for the environment varies widely and reflects the many attitudes towards and understanding of both environment and education. If we are to clarify our understanding of the significance and purpose of this particular form of educational activity, then it is important to know where it began and what it is today.

## HISTORICAL PERSPECTIVE

The concept of environment has its modern origins in the nineteenth century. This was the period when industrialisation brought about an unprecedented alienation of man from nature. It was also the period when the world's thinkers and scholars began to introduce new ideas born out of a deeper understanding of the world around them. For example, Charles Darwin's book on the *Origin of Species* (1859), proposed a non-theistic view of how all living things are the product of the environment working through the processes of natural selection. This view affected our understanding of both the environment and education. Ernst Haeckel (1834-1919), who was strongly influenced by Darwin's work, introduced the word *ecology* to describe the emerging new ideas about the relationships between living organisms and their bio-physical surroundings (Wasmann, 1910). Nearly a century later this word became the slogan of the conservation and environment movements.

Industrialisation brought with it the spread of a manufactured environment consisting of iron, glass and brick, fuelled by coal and human sweat, propelled by steam, and at a scale previously unknown. Human dignity and welfare were trampled in the rush for production, and nineteenth century England became one of the first countries to experience urban environmental problems of modern proportions. Control of nature and 'progress' were extolled as the virtues of the age but this spread of human dominance in the environment was not without its critics.

Among these was Patrick Geddes (1854-1933), a professor of botany, and a student of sociology. Geddes worked in Edinburgh, Scotland, where he opened the now famous educational establishment 'The Outlook Tower' in 1889. As he saw a close connection between the quality of education and the quality of the environment, he argued that a child who was placed in touch with the profound realities of its environment would, in all probability, develop a creative attitude to its surrounds. For Geddes, the human habitat resulted from an interaction between location, people and work: a trinity which came together in an environmental philosophy which he expressed in new approaches to civic design and regional planning. For many people, Patrick Geddes is the founding father of environmental education (Wheeler, 1970).

Changes in attitudes towards the environment were complemented by changing ideas about education. Taking as his starting point John Locke's *Essay Concerning Human Understanding* (1690), Watts (1969) identifies three main strands in the development of the environmental idea in education. The first strand is epistemological and Watts traces its development through thinkers and educators such as Herbart, William James and J. E. Adamson. More recently the empiricist view of knowledge has been developed by Piaget with his emphasis on concrete situations and continuous interaction between learners and their environment.

The second strand is philosophical and Watts sees this emerging from the work of Kant and Hegel in developing the 'idealist' thesis. Idealism was the most widely accepted philosophic attitude of the nineteenth century and the view that accumulation of experience from the environment was a necessary principle of human development had far reaching effects on education. By the late-nineteenth century John Dewey's pragmatist ideas (idealism modified in a more scientific form by the removal of the absolute or purpose) had further reinforced the experiential idea, although he did not confine his view to the concentration on local familiar environments. To him these were only the beginning, a means to explore the world beyond the child's everyday experience. Dewey's main concern was the relationship between education and society and as such he might be regarded as an advocate of social rather than environmental education.

The third strand is naturalism, greatly publicised by Rousseau in his *Emile*, and in the view of Watts an indication of the conservatism of modern progressive education. It was in the tradition of naturalism that Pestalozzi developed a theory of instruction involving observation and self-guided practice in the environment. In England the emergence of the tradition of naturalism occurred not so much in education as in cultural-aesthetic form, seen most readily in the poetry of William Wordsworth. The view that there was a cruel and destructive science which destroyed natural beauty and a humane science which took the form of observations of flora and fauna in an undisturbed environment emerged from his poetry. According to Watts, naturalist philosophy was a remarkably apt basis for educational doctrine in both England and America, because it spanned social classes and was highly adaptable. Naturalism provided environmental study with popular appeal and this was underpinned for the more scholarly by the work of Herbart, Froebel and Pestalozzi. So strong was this influence that Watts concluded his discussion:

> The naturalist element remains a mainspring of the environmental studies movement. During the 1960's the noble savages of the secondary schools have scrambled over the fells, and their field-studies centres steadily encroach on the Juan Fernandez of English romanticism, the Cumbrian Lake District (Watts, 1969).

The recent past has produced much more rapid change and action. The first half of the twentieth century witnessed the steady development of environmental consciousness. This can be seen in the implementation of the North American Migratory Birds Treaty of 1916, the emergence in the late 1940s of the International Union for the Conservation of Nature and Natural Resources (IUCN), and the creation in 1933 of the Tennessee Valley Authority whose approach to river basin management has found application around the world. In this same period, effective and important books on environmental matters such as *The Rape of the Earth: A World Survey of Soil Erosion* (1939) by G. V. Jacks and R. O. Whyte and *Sand County Almanac* (1948) by Aldo Leopold were produced. Books such as these did much to spur on the development of environmental consciousness. By the 1960s however, the gentlemanly pursuit of sound environmental goals was being replaced by an outcry that mankind was facing imminent disaster. Rachel Carson wrote a well-informed and devastating indictment of the indiscriminate use of pesticides in her book *Silent Spring* (1962) and stimulated great concern about the environment. The destruction of the Torrey Canyon in 1967 when it ran onto rocks near the English coast caused what was at that time the world's largest single oil slick. This inflicted great injury to the tourist and holiday industry as well as incalculable damage to the natural environment.

These kinds of events, and they were not the only ones, served to highlight man's relationships with the environment and a much more vigorous concern was to be seen and heard by the 1970s. The launching of the magazine *Ecologist*, in 1970, the publication of books such as *Population, Resources and Environment* (1970) by Ehrlich and Ehrlich, and *Science and Survival* (1970) by Commoner, were just the tip of an information revolution. The emergence of new organisations such as the Club of Rome and Friends of the Earth were symptomatic of the widespread concern about the environment and its future management. In response to this concern, new government agencies were created with responsibilities for regulation and control. Max Nicholson, the former Director-General of the Nature Conservancy, observed in 1970 'that the one thing in the world which is invincible is an idea whose time has come. Such an idea, in these days is the care of man's environment, or in a word conservation' (Nicholson, 1970). As with any widespread social concern, these new attitudes to the environment and education was emerging: no longer the rather neutral, naturalist practice of nature or field studies, but the committed activism of the kind envisaged by Patrick Geddes.

All the strands of thought and events which have influenced the development of environmental education cannot be given justice in this introduction. However, the essential element is that environmental education has well developed historical and philosophical foundations. As we formulate current programs and plans for the future, it is important to look back and try to understand the roots from which those seemingly new and reactionary ideas have grown. Then their apparent radical and reactionary image can be seen, in truth, to be conservative and moderate: a far more acceptable basis on which to launch new curriculum projects.

## ENVIRONMENTAL EDUCATION AS PART OF THE CURRICULUM

Environmental education is a process which is applicable to everyone and so should be directed at people of all ages. Its purpose is to produce an environmentally literate citizenry who will have the basic knowledge of and concern for the environment, awareness of the implications of issues, basic skills to cope with issues and initiate solutions, as well as motivation and commitment to the measures of environmental management.

At the school level in Australia we are concerned with a broad process which involves the development of awareness, knowledge, skills and attitudes which assist learners to understand the relationships between people and their surroundings. This process also involves the development of concern for the well-being of these relationships, making decisions and taking responsible action to improve the quality of life, and accepting both individual and group responsibility for environmental management. It can be developed through all the traditional subject areas of the school curriculum.

While environmental education can be developed throughout the school curriculum in many different subject areas, it is not without direction and purpose. As with other areas of educational endeavour the aims, objectives and guiding principles of environmental education have been distilled over many years. Those used here have been drawn from the recommendations of the Intergovernmental Conference on Environmental Education held in 1977 and have been adapted so that they apply specifically to the school level. They are included here not because they are immutable but because they provide an essential basis on which to build curricula in environmental education.

The *aims* of environmental education are:

- to foster awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;
- to provide every person with opportunities to acquire knowledge, values, attitudes, commitment and skills to protect and improve the environment;
- to create new patterns of behaviour of individuals, groups and societies towards the environment.

The *objectives* of environmental education are:

*Awareness* —To help learners acquire an awareness of and sensitivity to the total environment.

*Knowledge* —To help learners gain a variety of experience in, and acquire a basic understanding of the environment.

*Attitudes* —To help learners acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection.

*Skills* —To help learners acquire the skills for identifying and understanding environmental issues and participating in environmental improvement and protection.

*Participation* —To provide learners with an opportunity to be actively involved at all levels in environment improvement and protection.

Some *guiding principles* for environmental education:

- Environmental education should consider the environment in its totality: natural and built, technological and social dimensions.
- Environmental education should draw on the specific content of each discipline in order to construct an holistic and balanced perspective.
- Environmental education should utilise diverse learning environments and a broad array of educational approaches to teaching/learning about, in and for the environment with due stress on practical activities and first-hand experience.
- Environmental education should relate environmental sensitivity, knowledge, problem-solving skills and values clarification to every age, but with special emphasis on the learner's own community in early years.
- Environmental education should examine major environmental issues from local, national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas.
- Environmental education should emphasise the complexity of environmental improvement and protection and thus the need to develop critical thinking and problem-solving skills.
- Environmental education should promote the value and necessity of local, national and international co-operation in the prevention and solution of environmental problems.
- Environmental education should enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences.

This then is the basis on which curricula in environmental education have to be built.

## A CONCEPTUAL FRAMEWORK FOR ENVIRONMENTAL EDUCATION

The aims, objectives and guiding principles of environmental education provide the rationale from which an appropriate conceptual framework can be derived. The term 'conceptual framework' may appear very academic and therefore off-putting but it is simply a means of organising ideas around which a program of environmental education can be developed. In this particular case, we are presenting a framework which has three dimensions which for simplicity, we have called *objectives, content* and *learning situations.* These dimensions are represented diagrammatically in Figure 1 and are discussed in detail below.

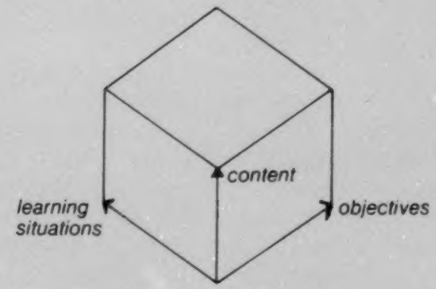


**FIG. 1: *A Conceptual Framework for Environmental Education***

## OBJECTIVES

The objectives of environmental education—awareness, knowledge, attitudes, skills and participation—are the horizontal dimensions in the conceptual framework and determine whether a program constitutes environmental education or some other form of education.

## CONTENT

The content dimension of the framework is one of the most vexed areas of discussion in environmental education because two important questions are involved: 'What is the content of environmental education?' and 'How should the content be organised?' These questions lead to other questions. For example: Is environmental education a discipline or does it draw from many disciplines? If it draws from many disciplines then which is to be most important and therefore to be granted most time in the program?

There is, of course, no correct answer so what we have done is to isolate sets of concepts which we believe identify the content of environmental education and which will assist teachers in their development of a balanced program. The concepts which encompass the content of environmental education include:

### *BIOPHYSICAL*

- Living things are interdependent with one another and with their environment.
- Green plants are the ultimate sources of food, clothing, shelter and energy in most societies.
- An organism is the product of its heredity and environment.
- In any environment, one component (space, water, air, shelter or food) may become a limiting factor.
  The natural environment is irreplaceable.

### *SOCIO-CULTURAL*

- The culture of a group is its learned behaviour in the form of customs, habits, attitudes, institutions and lifestyles that are transmitted to its progeny.
- The relationships between man and the natural environment are mediated by his culture.
- Natural resources affect and are affected by the material welfare of a culture and directly or indirectly by philosophy, religion, government and the arts.

### *MANAGEMENT*

- The management of natural resources to meet the needs of successive generations demands long-range planning.
- Family planning and the limiting of family size are important if overpopulation is to be avoided and a reasonable standard of living assured for future generations.
- Environmental management involves the application of knowledge in a rational direction to achieve a particular objective or objectives.

### *CHANGE*

- Organisms and environments are constantly changing.
- The rate of change in an environment may exceed the rate of organism adaptation.
- All living things including man are continually evolving.
- Man has accelerated the rate of change.
- Increasing human populations, rising living standards, and the resultant demands for greater industrial and agricultural productivity can promote increasing environmental contamination.

## ORGANISING THE CONTENT

The content of a program of environmental education can be organised in many ways. Four possible approaches are outlined here. They are not definitive and are meant only to serve as a guide to the developer of an environmental education program. You may wish to use more than one approach at different times, or you may choose one as the main approach and supplement it with one or more of the others. Whichever approach you choose, the selection of content should be guided by the basic concepts which undergird all environmental education.

### Approach 1: Organising Through Disciplines or Subjects

Sections of the content of an environmental education program may be clearly associated with a particular discipline or subject in the existing curriculum. In these circumstances responsibility for different aspects of the content of the program may be taken by different teachers with specialist knowledge or experience. For example the chosen content may focus on the chemical pollution of an urban waterway. Chemistry can contribute to an understanding of the pollutants and the chemical characteristics of the waterway. Biology can contribute to an understanding of the natural flora and fauna and the impact of pollutants on the physiology of these populations, geography to land use patterns, drainage patterns and climatology, all of which may lead to a concentration of pollutants in the waterway, history and social science to temporal and human perspectives, literature and music can provide avenues for expression using poetry, letters, dialogue and other forms.

To merely teach the content of environmental education through the disciplines, however, will not constitute a program of environmental education. The content must be taught with the objectives of environmental education in mind. This will place emphasis in the learning process on appropriate skills, attitudes, awareness and participation in addition to knowledge of the issue or area of study.

### Approach 2: Organising Through the Concepts

The basic concepts could be organised into a balanced environmental education program. Environmental education has an underlying philosophy which can be briefly expressed in the term 'earthmanship'. Earthmanship is derived from the idea of stewardship and involves the perception of environmental improvement and management as a complex mix of physical, social, political and economic factors. Everything is connected to everything and mankind's task is to retain the stability, complexity and diversity.

In an appropriate learning situation and with the objectives of environmental education in mind teachers could take the basic content concepts and develop a unit or subject for one level or for several levels of the school curriculum.

### Approach 3: Organising Through Case Studies

Real world situations are chosen and investigated using whatever methods are appropriate to the particular issues or case study. The real world as represented in the Press, on radio and television, in the local community, nationally or internationally provides a wide and varied stimulus for environmental education programs. For example, the announcement that a local council was going to clear a small urban park and build a football field for the local school could provide a focus for the study of:

- *An inventory of the plants and animals currently found in the park.*

  In carrying out the inventory, the students will be able to identify plants and animals using direct and indirect methods, use sampling techniques, prepare species lists, examine historical records to determine the origins of flora and fauna, examine the niches of species found, etc.

- *The status of the park.*

  Students will be able to examine the origins of the park; how the park came into being; and explore questions like the following: is the park a remnant of native bushland or is it composed of introduced species, are the species rare or common; does the park provide important habitats, does the park represent an urban refuge or is it a source of vermin and noxious weeds? Economic considerations of who currently pays, and how much do they pay to keep the park as it is compared with the costs involved in the alternative plan could be examined.

- *Users of the park in its present form compared with those for the proposed development.*

  Students could identify the types of users, the age of users, the time of day or week the park is currently used compared with the proposed usage. The students could examine whether the local community requires parks or football fields in terms of current facilities and usage patterns. Students could examine how people currently get to the park compared with how they will get to the football field. Studies could include traffic flows, car and bus parking requirements, noise levels, facilities etc. Perhaps different cultural perceptions of various kinds of parks and changing needs of communities could be examined.

- *Collation of a report which displays the key aspects of the two alternatives and the reason why one of these alternatives is being supported.*

  This task could be viewed as a sophisticated exercise in communication in which the talents of the students in writing, graphic communication and the display of their findings will be required to evaluate the strengths and weaknesses of the alternative land uses and to make a series of recommendations based on that evaluation.

- *Individual or collective action which may be taken to influence the local council.*

  If the final decision has yet to be made, then the presentation of the report to the local council meeting could be the outcome of this study. If the decision to build the football field has been taken, then group visits to the council chamber to study procedures and to talk with individual councillors or public figures may be required before the report is presented.

In using a case study such as the one described as a focus, the objectives of environmental education can be fully implemented. In this case study an *awareness* of the problems confronting people and the ways in which decisions about the environment are made have been introduced. *Knowledge* from existing subjects such as biology, geography, economics, mathematics and English, has been used. The students will begin to understand how attitudes can be changed. The study is one which involves *participation* in a student-teacher group both during the study and during the finalisation and presentation of the report. The *skills* which have been used are partly the skills from the disciplines but also the newly acquired skills of communication, co-operation, the synthesis of many separate pieces of information, and skills of problem definition and problem solving.

This is just one example and the real world of learners is full of many more. It is worth noting that learners will learn more readily and with enthusiasm and interest when they are actively involved in deciding what issues or case studies are to be investigated and in helping to gather the data which contribute to the investigation. It is more likely by this that the pitfalls of selecting content which bears little relationship to the real life experiences of the learners will be avoided. Nevertheless, it is also important that learners are guided into choosing new experiences so that they develop a well-rounded perception and understanding of the environment.

## Approach 4: Organising Through Processes

Two of the major processes in environmental education are problem-solving and values clarification. Either of these processes when combined with the objectives of environmental education and an appropriate learning situation can be a valuable tool for organising content.

Stapp (1974) has said that there are seven recommended steps in the problem solving process. These are:

- identifying and defining the environmental issues;
- collecting, organising and analysing data related to the issues;
- generating and evaluating alternative solutions;
- evaluating the alternatives and selecting the best solution generated;
- developing a plan of action;
- implementing a plan of action;
- evaluating the implementation process.

The development of skills in problem definition, data collection, organisating and analysing, generating alternative solutions, evaluating and selecting alternative solutions, and developing, implementing and evaluating action plans are key elements in environmental education.

Community problem solving also provides the opportunity to focus on values clarification. Values clarification procedures place emphasis on the process of valuing and not on the transmission of any right or absolute set of values (Simon *et al.*, 1972). As such, values clarification is of paramount importance in making rational environmental decisions, and must be a basic part of every environmental education program. Stapp (1974) has suggested that there are five steps in the values clarification process. These are:

- students and teachers identify an issue;
- students suggest alternative solutions;
- students consider the consequences of each alternative;
- students express their feelings about each alternative;
- students make a free choice.

This process helps learners become aware of personal beliefs, attitudes, values and behaviours which they prize and are committed to both in and out of the classroom. An important part of the teachers' role in this process is to help learners consider whether their stated beliefs, attitudes and values are congruent with their actions. By considering alternatives, the consequences of alternatives and their own personal feelings toward each alternative, learners begin to refine and develop their own set of values.

As organising ideas, problem solving and values clarification can be combined readily with an approach through case studies. For example, an environmental education program may involve the investigation of solutions for local community issues. This could comprise a series of 'environmental encounters' which relate to all the year levels and subjects available in a school. In the lower years there should be an attempt to bring about basic awareness and appreciation. While recognition and solution of relevant issues is appropriate, the honing of problem-solving skills should be left for the later years. Each encounter could be documented and placed on a punch card index so that a usefull environmental education resource is developed over time. Teachers could then extract environmental encounters appropriate to a particular discipline, concept or problem area, use them as previously or modify them to meet the needs of their particular group of learners and program.

## Learning Situations

Environmental education is not the sole preserve of any one subject or discipline and it is not confined within the four walls of a classroom. The objectives of environmental education suggest that it is something which recognises natural rhythms and times and takes place in the environment which is the subject of investigation. This is not to say that an environmental education program is not limited by the administrative and physical arrangements of a school but rather than these things should not be a straight-jacket into which environmental education is placed.

The words 'learning situation' are used in the context of this framework to embrace several elements relating to the how, where and when aspects of an environmental education program. There is no single teaching/learning model that all learners will respond favourably toward under all circumstances. Some learners respond favourably when the teacher acts as a conveyor of information. Others respond better when the atmosphere is one of strong interaction between the teacher and learners in the pursuit of common goals. What is important is that teachers assess their personal skills and the particular situation and then blend teaching models in an effort to create the most satisfactory learning experiences.

The traditional teaching model is characterised by the teacher who is an expert in a predetermined body of knowledge and conveys this material to learners. The subject matter of the learning experience in this situation is governed by the teacher's specialised knowledge and other external controls such as publishers, committees, curriculum experts or public examination syllabuses. The teacher assumes the role of expert and the learners are presumed to have few attitudes or thoughts about the content until after the experience is completed. The virtue of teaching based on this model is that it is neat, tight, controlled and orderly. It is not however a completely satisfactory model for teaching in an environmental education program.

As environmental education involves awareness, attitudes and participation as three of its five objectives, it is inevitable that a major part of the 'how' of environmental education must involve learning experiences which encourage discovery and which are action oriented. This compels us to consider a teaching model in which the teacher is part of a teaching/learning team with the tasks of creating a learning situation, assisting the learners to acquire information, providing them with guidance, and participating with them in the learning process. The creation of the learning situation may necessitate assisting students to select the issues or case studies they wish to investigate.

The answer to the 'where' of an environmental education program cannot be right or wrong. The most effective environmental education programs will include a direct interrelationship of learners with the environment. This first-hand experience might be in a natural forest, in the sewers under the street, on the tidal mud flats and in the mangrove swamp, at a busy intersection, at the local garbage tip or on the school grounds. But a balance should be maintained between the traditional sources of experience and information and those which involve direct experience of the environment for a balanced program cannot be conducted solely at a field studies centre any more than it can in the classroom. It is worth noting that direct experience does not require a bus trip to central Australia for the classroom, the school grounds, the learner's home and the local environment are rich with possibilities. It is also important to note that the objectives of environmental education involve the development of sensitivity and awareness—characteristics which require the use of the learner's senses and first hand experience. They also involve participation—the taking of responsible action on the part of learners with the aim of ensuring more harmonious relationships between man and environment. These objectives can only be met when the learner is exposed to the reality of the environment.

## IS ENVIRONOMENTAL EDUCATION DIFFERENT AND WHO SHOULD TEACH IT?

The perennial argument about whether or not environmental education is different from other educational practice seems to bedevil its consideration in the context of the school curriculum. As we view environmental education as a process of knowing and thinking about the world around us, we claim that it is different, for this process is not the sole preserve of any one subject or discipline. It is not a new discipline, nor is it a new subject. However, the practice of adding 'environmental' to subjects such as biology, geography and even the whole of science is common-place particularly at the tertiary level. In reality, the word 'environmental' when added to a subject in this way usually means a novel way of teaching the same old material and not that the subject is an essential part of an environmental education program or even contributing to such a program. We are not arguing that environmental science, geography or biology cannot contribute to an environmental education program but that they at best are simply that, a contributing part of a program.

Mayfield (1975) examined this question in more detail, advancing the idea that environmental education stood or fell on its affective and behavioural aspects. He said, 'Environmental education remains untaught, in every sense, unless at least three things are achieved beyond doubt: attitudes; genuine personal action; the transfer of knowledge and skills to new situations'. He went on to point out that in the teaching of, for example, physics something will be achieved by way of education about physics if it can be observed that learners have clarified concepts and learned skills. But if the purpose was environmental education then nothing of consequence will have been achieved if educators stop there. Lest the reader is saying, 'but physics is not part of environmental education because it is usually conducted in the classroom', let us add that environmental education is not the same as outdoor education or nature study at a field study centre, although these, like physics and other elements of the school curriculum, can be part of environmental education.

Most of the environmental issues of today are about cities, energy, population growth, food production and the conservation and management of natural resources. Environmental education is about knowledge, skills, attitudes and commitment to action which will enable men and women individually and collectively to confront and resolve these kinds of issues. It may involve a change in attitudes, a re-examination of values, not necessarily by teaching a new and prescriptive set of values, but perhaps by examining and clarifying our existing values in the light of a more informed awareness and understanding of the many facets of the environment. It is this process which makes environmental education different and it is at this process that teachers engaged in environmental education must succeed.

There is very strong agreement among specialists in environmental education that new courses added to the present primary and secondary school curriculum are *not* what is needed. Rather it is believed, and substantiated in part by the materials produced in the Curriculum Development Centre's Environmental Education Project that most existing courses or subjects can be used to develop concepts about or attitudes towards environmental concerns *if the teacher becomes aware of the possibilities* and *if the teacher and the school take seriously their respective responsibilities in this area.*

Some situations are obviously more promising than others. The primary school where a teacher typically has responsibility for a group of learners for much of a school day is clearly able to develop an environmental education program with that group more easily than the secondary school teacher who may provide learning experiences for six or seven different groups of learners each school day.

It is also evident that the environmental issues of greatest concern today are clearly interdisciplinary in nature. Where should the social impact of air pollution such as that associated with the industrial developments at Wollongong in New South Wales or the central business district of Melbourne in Victoria be studied? In social science classes since the problem is clearly of social concern? In chemistry and physics classes since these disciplines are also involved? In health education programs? In economics classes? In literature and music classes since young learners welcome the opportunity to express their feelings on such issues? Similar questions can be asked about all aspects of the environment and inevitably the answers will be the same.

Under the prevailing secondary school curriculum it is unlikely that environmental issues will receive the interdisciplinary treatment they require. Science teachers are not able generally to look at an issue and see all the ramifications apparent to a sociologist. The sociologist on the other hand may be unaware of scientific principles which are elementary and fundamental to the understanding of the environment. The historian will have a different perspective yet again. Some teachers will not even perceive that they have a role to play in environmental education.

For environmental education to really succeed *it is necessary for all teachers to regard themselves as teachers concerned with environmental education.* All teachers, possibly with the help of specialists in the methodology of environmental education, should locate and use materials which are pertinent to their own particular subject field and which are useful in sensitising learners and helping them to understand more about environmental matters. While primary school teachers are in a much stronger position to gear more of their teaching to environmental concerns, secondary school teachers also have advantages. Co-operation between subject areas may be administratively and practically difficult but team planning and teaching has much to offer in developing environmental education at this level.

## SHOULD ENVIRONMENTAL EDUCATION BE TAUGHT DIFFERENTLY?

We have already alluded to the fact that environmental education cannot be taught like most other subjects. There are three issues which must be squarely faced in answering this question.

Firstly, environmental education, in common with many subjects, is concerned with attitudes. As such it should involve learners in examining and thinking about the value conflicts inherent in Australian society which bear on our ability to manage the environment and our quality of life. At a personal level, learners should be encouraged to think about their own behaviour as it influences the quality of their living and that of others around them. Environmental education must allow learners to consider the options available in resolving the conflicts of interest inherent in environmental improvement and protection. They must become aware of what must be given up in order to gain something else.

Secondly, environmental education is concerned with co-operation. Improvement and management of the environment at all levels involves co-operation, and environmental education programs must help learners develop co-operative skills and attitudes. Co-operative efforts in the field of environmental education can develop at many different levels within the school setting. A single class group may undertake a beautification or clean-up project for the whole class or for the school generally. On the next level, the whole school may be engaged in studying, lobbying for and rectifying an environmental problem in the community in which they are situated. On a higher level again, a school or group of schools may work co-operatively with government and research agencies in an environmental study or management program.

Thirdly, while understanding about the environmental is a pre-requisite to action, the emphasis in an environmental education program must be placed on changed behaviour. Efforts of teachers should be directed toward helping learners develop behaviour patterns which contribute toward improving rather than demeaning their environment. Schools should help learners develop the habit of involvement and become used to assuming personal responsibility for environmental protection and management. Submitting petitions to the proper authorities, attending public hearings, and writing letters about environmental issues at all levels are examples of responsible long term behaviour which can commence under the guidance of a teacher and be continued throughout a lifetime.

It goes without saying then that environmental education must be taught differently if these things are to be achieved. Stenhouse (1975) has said that there appears to be three ways of teaching environmental education, though there are major variations on all of these:

> One is to treat environmental education as a topic in a general or liberal studies course. A second is to locate the heart of environmental education in the teaching of the sciences. The third is to regard environmental education as an emphasis which might express itself throughout the curriculum.

We believe that none of the approaches suggested by Stenhouse are entirely satisfactory. The first has the disadvantage that it tends only to reach the learners outside the professional and academically oriented stream. It also runs the risk that environmental education gets packaged into a separate compartment for a particular time and then forgotten like so many other school topics. The second approach although frequently presented as an integration of the sciences suffers in that it may only expose those learners in a science oriented stream to some environmental issues. In this situation it must not only compete with the traditional science disciplines which are accredited as a basis for further academic studies but suffers the problem of the environment being examined through a narrow disciplinary perspective. The third approach suffers from the inevitable conclusion that there is no essential skill and knowledge base to environmental education and that it is an effect that can be achieved through any subject area. This approach may vastly improve the subjects themselves by making them more relevant to the real issues of life but it is not environmental education.

What is required is a fourth approach, an approach which influences the subjects across the curriculum, both vertically and horizontally. It is an approach which integrates knowledge, teachers and learners so that the dynamic process that is environmental education can take place at the level of individual learners, groups of learners, and the whole school.

## REFERENCES

Mayfield, J., 'Is environmental education teachable? Considerations for teacher education', in R. D. Linke (ed.), *Education and the Human*

*Environment,* Curriculum Development Centre, Canberra, 1977.

Nicholson, M., *The Environmental Revolution, Hodder and Stoughton, London, 1970.*

Simon, S. B., *et al. Values Clarification: A Handbook of Practical Strategies for Teacher and Student.* Hart, New York, 1972.

Stapp, W. B., 'An instructional program approach to environmental education (K-12)—based on an action model', in J. A. Swan and W. B. Stapp (eds.) *Environmental Education,* Halstead Press, Wiley, New York, 1974.

Stenhouse, L., 'Aspirations and realities in environmental education', in R. D. Linke (ed.) *Education and the Human Environment,* Curriculum Development Centre, Canberra, 1977.

Watts, D. G., *Environmental Studies,* Routledge and Kegan Paul, London, 1969.

Wasmann, E., *Modern Biology and the Theory of Evolution,* Kegan Paul, Trench, Trubner and Co., London, 1910.

Wheeler, K. S., 'The Outlook Tower: Birthplace of Environmental Education', *See—Bulletin of the Society of Environmental Education, 1970.*

## Further Reading

Fensham, P., *A Report on the Belgrade Conference on Environmental Education,* Curriculum Development Centre, Canberra, 1975.

McInnis, N. & Albrecht, D., *What Makes Education Environmental,* Environmental Educators Inc., Washington D.C, 1975.

Stapp, W. B. & Cox, D. A., *Environmental Education Activities Manual,* University of Michigan Press, Ann Arbor, Michigan, 1979.

Swan, J. A., & Stapp, W. B., *Environmental Education,* Halstead Press, Wiley, New York, 1974.

# *DEVELOPING A SCHOOL POLICY ON ENVIRONMENTAL EDUCATION*

*Bob Stevenson*

---

## PREAMBLE

The previous papers in this sourcebook outlined the purpose as well as the aims, objectives and guiding principles of environmental education, and suggested some approaches to organising its content. This paper provides guidelines for a secondary school to consider and express its particular commitment to environmental education. The intended outcome of this process is the formulation of a school policy on environmental education. The objectives and guiding principles that were outlined in the previous papers provide the starting point for developing this policy.

---

## INTRODUCTION

The particular and unique purposes of a school frequently are expressed in a statement of school philosophy and aims. Such a statement reflects the beliefs of staff, and hopefully students and the local community, with regard to their goals for student development. It is intended to provide identity and a sense of direction to a school. Many schools extend their statement of philosophy beyond their goals for student development to a description of principles or framework under which the school should function to achieve these goals. In other words a consideration of the implications of the agreed goals leads to a further statement about aspects of the school's learning environment, such as organisational style, curriculum, and student-teacher interactions.

The previous authors emphasised that environmental education is not just a body of knowledge and skills to be acquired and applied, but a process or way of thinking that includes the development of attitudes towards the environment and involvement in its improvement and protection. Environmental education aims to develop attitudes, values and behaviours which lead individuals to a personal environmental ethic. Consequently it necessitates the use of educational techniques and situations which assist students to explore, investigate and identify their own relationship to and role in their environment. The *guiding principles* and the *learning situations* component of the conceptual framework detailed some of these implications for the teaching/learning process.

The Environmental Education Project has been unable to identify a secondary school in Australia whose statement of philosophy or aims incorporates environmental education. Yet acceptance of the need for environmental education has been found among many secondary school teachers. They, and other teachers, consistently express concern about the difficulty of having environmental education incorporated as a part of a secondary school's total curriculum. Yet given the nature of environmental education, as referred to above, it is acknowledged that the mere introduction of a new course or units of work related to the environment in a number of subjects is not sufficient in itself to achieve all its objectives. The development of attitudes and skills for participating in environmental protection and improvement requires a school commitment that goes beyond classroom activities. Consider, for example, the impact of a lesson on recycling materials which is followed by students being told to dispose of clean waste paper in the incinerator, or the effectiveness of a unit of work aimed at developing skills for citizen participation in environmental decision-making when students are denied the experience of participation in any decisions affecting their school community.

The process of environmental education impinges upon most aspects of a school's operations — its organisation, curriculum, student-teacher interactions, buildings and grounds maintenance, disposal of waste products, canteen services, etc. Thus, as Hawkins and Vinton (1973) have stressed, 'the broad concept of environmental education requires an institutional (school) structure supportive of its unique requirements'. A suitable method for articulating such a structure is the formulation of a policy on environmental education as a part of the school philosophy or aims. Once this policy has been agreed upon by the school's staff, students and parents, a plan for implementing environmental education through both the formal and informal (or 'hidden') curriculum can be designed.

## FORMULATING AN ENVIRONMENTAL EDUCATION POLICY

The actual process of formulating an environmental education policy is as important as the end product or final statement. A discussion of questions outlined in the following Guidelines should enable all members of staff (both teaching and ancillary), students and parents to develop and clarify their own attitudes towards environmental education and the school's role in this area. Consequently it is essential to provide everyone who will be involved in its implementation with this opportunity. A complete consensus will be unlikely and a divergence of views may need to be accommodated. A balance needs to be obtained, however, so that sufficient consistency and direction are provided. Contributors, nevertheless, shouldn't feel that their views have been rejected to the extent that they are unable to identify with the final policy.

It would be helpful to have some form of structure for co-ordinating this process and for engaging teachers in a continuing dialogue about environmental education. A representative committee, for example, could be such a structure and prepare a draft statement for discussion. The committee could include representatives from a local conservation or environmental protection group, a member of the planning staff of the local council and any community personnel with relevant expertise, as well as from each subject department and the non-teaching staff, students and parents of the school. The draft statement could be circulated for comment among all parents, students, and relevant community organisations.

## WHAT SHOULD THE POLICY CONTAIN?

To answer this question it will be necessary to examine both the objectives and principles of environmental education and the current educational practices within your school. Tables I and II provide a series of questions concerning a school's practices which are derived from the *objectives* and *guiding principles* for environmental education (as stated in *A Conceptual Framework for Environmental Education K-12).* In Table I assumptions which seem to underlie the objectives listed have been included to help clarify how the implications have been derived.

These questions can be used as a discussion starter by a school staff or representative committee in developing a draft school policy. Alternatively the process can be started with the Guidelines outlined in the following pages in which the same questions have been organised into three areas of a school, namely: The Physical Environment, The Social and Learning Environment, and The Curriculum. In this case Tables I and II could be used for reference when in doubt as to how a particular question is related to environmental education. It is essential that the school's administrators are involved in considering at least the first two areas and that all teachers participate in the Curriculum area.

The questions posed are intended to provide stimulus for teachers and administrators to reflect on and analyse their own classroom and administrative practices. In other cases students should be involved in expressing their opinions and in investigating some of the questions and issues that arise. For example, Science students could carry out an energy usage study within the school, suggest ways of improving energy conservation and be given responsibility for implementing such measures. This is one way in which the development of the school policy can be used to identify the contribution to environmental education of teachers from different subject areas.

**Resources to Assist:**

Currie, K (1975), 'The School Policy: Notes and Guidelines for Consideration in the Construction of a School Policy', *Unicorn,* 1(1), 65-73.

**Table 1:** ***Implications for School Policy of Environmental Education Objectives***

| | OBJECTIVES | ASSUMPTIONS | QUESTIONS TO CONSIDER |
|---|---|---|---|
| *Awareness—* | *To help students acquire an awareness of and sensitivity to the total environment.* | • environmental awareness and sensitivity, in addition to an understanding of environmental issues, must be developed in order to generate feelings of concern and a desire to participate in environmental improvement and protection.<br>• sensitivity can only be acquired through exploration, investigation and reflection. | • Does experiential learning receive equal recognition to theoretical learning?<br>• How are inquiry and other learning methods which actively involve students emphasised? |
| *Knowledge—* | *To help students gain a variety of experiences in, and acquire a basic understanding of the environment.* | • an understanding of the environment is important for society to live in harmony with the environment.<br>• development of perceptual awareness of environmental issues can be affected by the variety of environmental experiences.<br>• experiences in the environment will stimulate cognitive and affective learning. | • What opportunities are provided for students to undertake a range of educational activities in different environments?<br>• What opportunities are provided for students to develop skills in low-impact recreational activities which enable close experiences and contact with the environment?<br>• How is the student's own environment used to develop an understanding of the environment? |
| *Attitudes—* | *To help students acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection.* | • value systems can be in conflict with environmental improvement and protection.<br>• schools can influence the development and maintenance of such attitudes.<br>• cognitive understanding does not necessarily result in feelings of concern for the environment. | • How are students encouraged to recognise conflicts of interest in environmental improvement and protection?<br>• Do students perceive the school staff as demonstrating feelings of concern?<br>• How does the school reflect a concern for the environment in its design, maintenance and daily operations?<br>• What consideration is taken of the role of other social institutions (e.g. family, mass media) in the formation of attitudes toward the environment?<br>• How are students being exposed repeatedly to a range of ideas about environmental improvement and protection? |
| *Skills—* | *To help students acquire the skills for identifying and understanding environmental issues and participating in environmental improvement and protection.* | • environmental improvement and protection will be enhanced by equipping future citizens with these skills.<br>• perceptions of environmental quality cannot be based solely on personal experiences but require an understanding gained by the use of the skills of inquiry.<br>• all students can develop the skills for identifying and understanding environmental isues.<br>• students (and citizens) can gain access to adequate information relating to environmental issues. | • How is the development of inquiry and decision-making skills fostered?<br>• How are students and teachers encouraged to co-operatively investigate local environmental issues?<br>• How are students made aware of how, as citizens, they can have an effect upon decision-making on environmental issues?<br>• How are students encouraged to become involved in environmental improvement and protection projects (including ones involving their school grounds and buildings)? |
| *Participation—* | *To provide students with an opportunity to be actively involved at all levels in environmental improvement and protection.* | • students can perceive the relevance of such participation to their present or future lifestyle and/or to the future of society.<br>• community participation in environmental improvement and protection will eventually be increased by involving future citizens whilst at school. | • How are students involved in selecting and planning the activities and projects they undertake?<br>• How is the view and involvement of parents and the community sought in relation to various types of student participation in environmental improvement and protection? |

**Table 2: *Implications for School Policy of Guiding Principles***

| GUIDING PRINCIPLES | QUESTIONS TO CONSIDER |
|---|---|
| • *Environmental education should consider the Environment in its totality—natural and built, technological and social dimensions.* | • What provisions are made for familiarising teachers with the nature and scope of environmental education? |
| • *Environmental education should draw on the specific content of each discipline in order to construct an holistic and balanced perspective.* | • What provision is made for interdisciplinary curriculum planning? |
| • *Environmental education should utilise diverse learning environments and a broad array of educational approaches to teaching/learning about, in and for the environment with due stress on practical activities and first-hand experience.* | • Are excursions regarded as important as classroom-based activities?<br>• What range of teaching/learning methods are used?<br>• Do practical activities and "hands-on" experiences receive due emphasis. |
| • *Environmental education should relate environmental sensitivity, knowledge, problem-solving skills and values clarification to every age, but with special emphasis on the learner's own community in early years.* | • What cognizance is taken of the student's background of environmental knowledge, skills, and attitudes?<br>• What activities are undertaken which involve students in practical investigations within their local community?<br>• What procedures have been established for examining controversial issues? |
| • *Environmental education should examine major environmental issues from local, national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas.* | • Are people from the local community invited to present a diversity of views on environmental issues?<br>• What resources are available for teachers to deal with environmental issues from national and international perspectives? |
| • *Environmental education should emphasise the complexity of environmental improvement and protection and thus the need to develop critical thinking and problem-solving skills.* | • Do teachers accept the role of facilitating and guiding students in solving problems, rather than solving problems for them?<br>• What opportunities are provided for students to develop critical thinking and problem-solving skills? |
| • *Environmental education should promote the value and necessity of local, national and international co-operation in the prevention and solution of environmental problems.* | • How are students able to co-operate with the local community in the prevention and solution of environmental problems? (Is the local community encouraged to help the school solve any of its problems?)<br>• How are students encouraged to contribute to the prevention and solution of environmental problems at national and international levels? |
| • *Environmental education should enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences.* | • How much choice do students have in selecting and planning their learning experiences?<br>• What opportunities are provided for students to make decisions and accept responsibility for the school's operation? |

## GUIDELINES FOR AN ENVIRONMENTAL EDUCATION POLICY

### 1. THE PHYSICAL ENVIRONMENT

| | Consider |
|---|---|
| How does the school reflect a concern for the environment in its: | |
| (a) design: | • energy efficiency of buildings<br>• aesthetics of design in relation to the site and its surroundings<br>• landscaping of grounds for study, aesthetics and use of wildlife. |
| (b) maintenance? | • type of building materials used in relation to their maintenance demands<br>• state of repair of buildings<br>• gardening practices (e.g. use of pesticides, mulching of garden beds). |
| (c) daily operations? | • disposal of waste products<br>• energy and water conservation measures<br>• use of recycled materials<br>• traffic flow within the school<br>• transport to and from the school (encouragement of walking, cycling and use of public transport)<br>• maximum usage of school resources (e.g. availability to the community)<br>• noise generators (eg. intercom system). |

### Resources to Assist:

Tidswell, A. 'Environment Guidelines for Schools', in *Environmental Education: A Sourcebook for Primary Education,* Curriculum Development Centre, Canberra, 1981.

Smith, J.H. and Wilson, J.R. 'Developing School Grounds for Environmental Education', in this volume.

New South Wales Public Works Department, *Self-Help Manual,* N.S.W. Government Printer, Sydney, 1979.

Stapp, W.B. and Cox, D.A. (eds.). *Environmental Education Activities Manual* Vol. V, Stapp and Cox, Michigan, 1974.

### 2. THE SOCIAL AND LEARNING ENVIRONMENT

| | Consider |
|---|---|
| Are excursions regarded as important as classroom-based activities? | • acceptance of the value of excursions in all subject areas |
| What opportunities are provided for students to undertake a range of educational activities in different environments? | • flexibility of timetable<br>• school procedures for organising an excursion |
| What opportunities are provided for students to develop skills in low-impact recreational activities which enable close experience and contact with the environment? | • availability of bushwalking, canoeing, skin diving, etc. as school activities<br>• inclusion of outdoor education skills in physical education program |
| Do students perceive the staff as demonstrating feelings of concern toward the environment? | • attitudes towards questions raised under Physical Environment<br>• staff use of car-pooling and public transport<br>• use of recycled paper in classrooms and school office |
| What opportunities are provided for students to make decisions and to accept responsibility for the school's operations? | • student organisation of camps, sporting and social events, etc.<br>• student representation on school committees |

| | |
|---|---|
| | • student involvement in establishing and enforcing school rules and policies<br>• channels of communication between students and the administration<br>• student involvement and responsibilities in library, canteen, office, first aid room, etc. |
| Are students encouraged to become involved in environmental improvement and protection projects (including those involving their school grounds and buildings)? | • student and community involvement in designing and undertaking landscaping of school grounds, interior decorating of classrooms and buildings |
| Are students able to co-operate with the local community in the prevention and solution of environmental problems? | • school provision of community recycling centre<br>• students working with government departments, community organisations or individuals in investigating and taking action on local environmental issues (e.g. land use planning) |
| How is the view and involvement of parents sought in relation to various types of student participation in environmental improvement and protection? | • consultation with parents on above projects |
| What provisions are made for familiarising teachers with the nature and scope of environmental education? | • distribution or circulation of staff to *A Conceptual Framework for Environmental Education K-12* and other relevant readings<br>• staff time for participation in in-service education<br>• personnel to conduct school-based in-service |
| What resources are available for teachers to deal with environmental issues from national and international perspectives? | • library subscriptions to national (e.g. *Habitat, Ecos*) and international (e.g. *The Ecologist*) journals on the environment<br>• availability of suitable curriculum resource materials (e.g. about Project Jonah and nuclear debate) |

**Resources to Assist:**

Womersley, J. and Stokes, D. 'Environmental Education: A Conceptual Framework', in this volume.

Terry, M. (1971), *Teaching for Survival,* New York. New York.

Selected items could be used from some of the following instruments which measure classroom and school learning environments:

'High School Characteristics Index' in Stern, G.G. (1970), *People in Context,* Wiley, New York.

*Questa: Secondary School Research Program,* Educational Testing Service, Princeton, N.J.

Finlayson, D.F. *et al.* (1970-71), *School Organisation Index, School Climate Index and Teacher Questionnaire on Teacher Group Behaviour,* NFER Publishing Co, Windsor.

Steele, J.M. (1970), *The Class Activities Questionnaire,* Centre for Instructional Research and Curiculum Evaluation, University of Illinois, Urba.

### 3. The Curriculum

| | **Consider** |
|---|---|
| What provision is made for interdisciplinary curriculum planning? | • role of school curriculum committee/task force<br>• inter-faculty staff meetings<br>• timetabling for team teaching<br>• staff time for curriculum development. |
| Does experiential learning receive equal recognition to theoretical learning?<br>Do practical activities and 'hands-on' experiences receive due emphasis? | • importance attached to field trips, work experience with environmental agencies, community service on environmental improvement projects<br>• assessment of experiential learning on equal basis to classroom learning. |

| | |
|---|---|
| How are inquiry and other learning methods which actively involve students emphasised? | • use of small group and individual practical student investigations and individualised instruction<br>• use of peer tutoring and contract learning (with teacher and community personnel) |
| Do teachers accept the role of facilitating and guiding students in solving problems, rather than solving problems for the students?<br>What opportunities are provided for students to develop critical thinking and problem-solving skills? Is the development of inquiry and decision-making skills fostered?<br>How much choice do students have in selecting and planning their learning experiences? | • preparedness of teachers to admit ignorance and accept role of learner as well as teacher<br>• allowance for students to define problems and seek out solutions<br>• encouragement of questioning of so-called authoritative sources<br>• opportunities for students to make independent decisions in various learning situations (including through involvement in local environmental issues) |
| How is the students' own environment used to develop an understanding of the environment?<br>What procedures have been established for examining controversial issues?<br>How are students encouraged to recognise conflicts of interest inherent in environmental improvement and protection? | • use of examples from the students' immediate environment to illustrate ecological concepts<br>• account taken of students' perceptions of their environment<br>• criteria for selecting issues<br>• strategies for guiding discussion on analysis of issues<br>• role of teacher<br>• use of simulations and role play which require students to clarify and resolve conflicting values<br>• analysis of local environmental issues using data presenting conflicting points of view |
| What consideration is taken of the role of other social institutions (e.g. family, mass media) in the formation of attitudes towards the environment? | • critical examination of media treatment of environmental issues<br>• parents' views on environmental issues |
| Are people from the community invited to present a diversity of views on environmental issues? | • land developers, council aldermen, town planners, residents, farmers, foresters, etc. as resource personnel |
| How are students and teachers encouraged to co-operatively investigate local environmental issues? | • land use planning conflicts (e.g. siting of new highways or shopping complexes)<br>• adequacy and design of local park and recreational facilities |
| How are students made aware of how, as citizens, they can have an effect upon decision-making on environmental issues? | • exposure to political avenues for influencing decisions (e.g. petitions, deputations)<br>• role of environmental centres and conservation organisations |
| How are students encouraged to contribute to the prevention and solution of environmental problems at national and international levels? | • authorities (local, State, Federal) with jurisdiction in environmental matters<br>• taking action, using above knowledge, on issues which concern the student |

### Resources to Assist

Ball, C. and Ball, M. (1973) *Education for a Change*, Penguin Education, London.

Education Department of South Australia. *A Guide to a Process of Curriculum Development.*

Hawkins, D.E. and Vinton, D.A. (1973), *The Environmental Classroom*, Prentice-Hall Inc., New Jersey.

National Committee on Social Science Teaching (1972), *Handling Controversial Social Issues*, Report of the First National Workshop, Raywood In-Service Centre, South Australia.

Stapp, W.B. (1974), An Instructional Program Approach to Environmental Education (K-12) — Based on an Action Model, in Swan, J.A. and Stapp, W.B. (eds) *Environmental Education*, John Wiley, New York.

Whimp, J. 'Developing a School Field Study Centre', in this volume.

# *APPROACHES TO CONTROVERSIAL AND VALUES ISSUES IN ENVIRONMENTAL EDUCATION*

*Kevin Blachford*

**PREAMBLE**

How do you manage controversial issues in the classroom? How may values be developed by schools? This paper is directed toward answering those questions. In so doing, it is not intended to detail many of the various factors affecting value or attitude acquisition and retention but to focus on teaching. Four main approaches (Inquiry Approaches, Action Research, Personal Development Approaches and Indoctrinary Approaches) are isolated for consideration.

## INTRODUCTION

Controversy generally concerns matters of fact, goals, and strategies or means:

- *Facts:* Disputes over matters of fact (e.g. a dispute as to the surface area of a lake) may be settled readily by an appropriate, agreed measurement.
- *Goals* are an obvious area of controversy in a great variety of situations. However, goal priorities may be the real controversy (e.g. an individual may support freeways, low density housing, large areas of parkland and so on) but the proposal to run a freeway across a local park compels that person to decide his or her priorities. Another person may have different priorities. At a more abstract level, two persons may value 'freedom' and 'equality', with one person giving higher priority to the personal acquisition of wealth, even if this entails loss to other people or likely loss to later generations. Another person may place higher priority on 'equality' and seek to eliminate differences between high and low incomes and/or access to resources, even if this entails legislating against certain practices.
- *Strategies or means* are also frequently controversial, with some persons prepared to argue that unpopular or even unpalatable means are justified by the worthy ends that are being sought.

Values are involved obviously in the latter three kinds of controversy, and in four basic ways:

1. *Different values relating to different goals and/or means:* This position is easy to understand. One group may seek a short term maximisation of personal income (e.g. by cutting out a tropical rainforest area) whilst another group may have long-term community-oriented goals and so seek the conservation of such areas for recreational use. To take another example, one person may oppose freeways on the basis that freeways disrupt existing neighbourhoods and even isolate some areas geographically. In effect, such an attitude may reflect a valuation of close human interaction or interdependence. Another person may value individual independence and so possibly support freeways as facilitating geographical mobility.

2. *Different values relating to the same goals and/or means:* One person may support new freeways on the basis of efficiency of transport whilst another person supports freeways on the basis of reduced pollution in his own neighbourhood. However, despite the agreed goal both parties may again disagree on the precise location of the freeway, the means of funding the project, the design, and other matters relating to the means of accomplishing the goal.
3. *Same values relating to the same goals and/or means:* People who have the same values may support the same goals and the same means for attaining those goals. In this case, there would be no controversy. However, persons may disagree over either means or goals.
4. *Same values relating to different goals and/or means:* Thus, a valuation of 'equality' may be held to imply greater tax rates on higher incomes whereas another person may hold 'equality' to mean the same tax rates on all incomes.

For some, 'freedom' means permission to act without any restriction. For others, it means protection from the decision of the majority unless the minority is infringing the liberty of others (see Mill 1910). For others, it means opportunity to vote on alternatives and then to believe or obey the majority decision (e.g. for 'national unity' or 'party unity').

Words like 'democracy', 'freedom', 'natural', and 'good' may be held by an individual to be his or her value and yet the meaning or implications be disputed by other persons. It is wise, then, to be aware of the need for students to clarify their meanings or to give concrete examples when such terms are used in reports or discussions. Moreover, there is need to be aware that there may be an inconsistency between stated values and actual behaviour.

Thus, some controversial issues involve values but values education is not necessarily controversial: the inculcation of procedural values or of the values involved in rational thinking (Blachford, 1971) is generally accepted. I want now to present some practical approaches to controversial issues and values education.

## INQUIRY STRATEGIES INVOLVING MORAL JUDGEMENTS

The sequences in the following strategies are not necessarily specific to any particular study, but may function as a general guide to those new to such inquiries.

A. **Present Day Issue**

1. Identifying the issue, e.g.
   - Should Australia mine and export uranium? Why?
   - Should oil exploration be banned from the Great Barrier Reef? Why?
   - Why has environmental quality arisen as a public issue?
   - Should Sydney have a nuclear power plant? Why?
2. Collect data pertaining to the issue.
   Verify the data if possible, or try to establish the degree of validity of the data.
3. Identify alternative solutions including compromises.
   This step will include the alternative presented in the public debate as well as other logical possibilities.
4. Detail the expected or known consequences, positive and negative, of each alternative and on as many dimensions as possible, e.g.
   - ecological, economic, social, political.
   This step will involve further data gathering, data analysis, and presentation.
5. Evaluate the alternative solutions and the justifications.
   Consider the following:
   - were *all alternatives* considered seriously?
   - were the *consequences* of each alternative adequately described and considered?
6. Which alternative appears to be the most acceptable? Why?
   - Was the selected alternative chosen freely?
   - Are relevant and rational reasons given for the decision?
   - Is the decision the most beneficial one?
   - On what criteria? Are the criteria adequate?
   - What general moral principle(s) is (are) used in evaluating the alternatives? What is the justification of that (those) principle(s)?
   - Would it be appropriate for any person confronting the same or similar (but perhaps in other time or place) situation to make the same decision?
   - Is your decision consistent with other decisions you make?
7. Will (or would) you act on your decision? How?

Is your decision consistent with your behaviour?
What ought to be your behaviour?

8. Make a final decision, and proceed to action or implementation.

B. **Past Issue**

1. Identify the issue, e.g.
   - Should the Alaskan pipeline have been built? Why?
   - Should the Concorde have been given U.S. airspace? Why?
   - Should the Albany (W.A.) whaling station have been closed? Why?
2. Identify the alternatives perceived at that time.
   - What problem faced the person or group?
   - What alternatives were perceived at that time?
   - What alternatives were possible but apparently not perceived at that time?
3. Identify the consequences projected at that time.
4. What decision was made at that time? What justification was given for the decision at that time?
5. Evaluate the decision and the justification at that time in terms of steps 5 and 6 of Model A (Present Day Issue).
6. What decision would you have made or supported at that time?
7. What justification do you give of your decision?
8. What consequences did occur? Can it be verified that these events were due to the decision?
9. What decision would you make if a similar issue arose in the future? Why? (Again, refer to steps 5 and 6 of Model A).

C. **Value Study**

1. Define the value, e.g.
   - profit maximisation,
   - maximum efficiency of transport,
   - personal mental health.
2. Detail the expected consequences.
   - What would you expect to find in the real world if this value were operative?
3. Observe reality.
   - Can the hypothesised consequences be found in reality?
4. Interpretation.
   - Can these observations be due to values other than the one being investigated?
5. Analyse the value.
   - Do you think the genuine consequences are desirable or not? What criteria are you using to judge the consequences?
6. Evaluate the value.
   - Is the value a good one morally? On what grounds? Are the grounds adequate?
   - What are the positive and negative consequences? To which consequence(s) do you give most weight? Why? What general moral principle is being supported? Why?
   - Are the conditions or situations in which the value is appropriate (or inappropriate)? What are those conditions or situations?

These schemes have been based on the assumption of one decision-maker. In social issues, other people are involved. There is need to consider, then, such questions as, What are the views of others? Is compromise needed and possible in order to agree upon a policy or a prudent, practical course of action for the time being?

## ACTION RESEARCH *(after Newmann, 1975)*

Action Research may be conducted independently of the strategies listed above, or it may well follow from any of them. Action Research involves trying to correct injustices, preserve just conditions, or to implement changes of some kind in the continuing 'real world'. As action is being taken, the system is monitored, and information gained may lead to changes in the action strategy until satisfaction has been obtained.

The following sequences may serve as a general guide to proceeding in Action Research for some environmental issues.

1. Identify the issue, e.g.
   - The high *E. coli* levels in shellfish (assuming it has been established) may be of concern to students who then seek to redress this situation.
   - Litter in the school yard (aim to reduce it).
   - Inadequate playground equipment.
   - Pollution in a local river or creek.

2. Study present laws or policy relating to the matter.
   - Should there be new laws or a revision of existing laws? Why?
   - Is there an injustice in principle or in practice or both?
3. Decide 'shall I become involved?'
   Consider your decision in the light of moral considerations (steps 5 and 6, Model A [Present Day Issue]).
4. Collect and record further, accurate data about the situation.
   This will include information about supporters and opponents and may include journalistic skills such as 'muck raking' to gather information about the situation, the law enforcement and vested interests.
5. Plan a strategy to bring about changes thought to be right morally, and
6. Implement the strategy, monitor the effects and make changes as felt necessary,

OR

Draw up a case.
This calls for a range of skills, including advocacy or persuasion.

7. Win support of appropriate groups and individuals.
8. If necessary, organise a public campaign.
   This may involve learning how to operate a meeting, function at a meeting, raising funds, getting favourable publicity, keeping records, negotiating, and so on.
9. Monitor the actions taken to determine their effect, making changes to the strategy in order to improve it until satisfaction has been obtained.

Newmann (1976) is strongly recommended as reading for those interested in action research in secondary schools. Newmann contends that education should be for 'environmental competence' rather than solely for 'inner comprehension'. Many potential improvements in the world remain paper projects, or are held by people who believe sincerely that the 'just case' will automatically win the support of all who read it. Newmann argues that students need experience of, and skills in, advocacy. Students need to know how to have an impact on social policy and practice. Thus, courses on the formal structure and operation of government, business, and even of local clubs, do not reflect the operation of reality. Newmann urges that education is incomplete if it merely teaches students to think about issues rather than also to equip them to exert influence in public affairs and in their own lives.

The scheme at Madison High School Wisconsin requires each student to join with at least one other student to execute a community project. Each student must meet regularly with a teacher to discuss the project and is required to report the project to the class. The sequence used in leading students toward action research is:

1. *exploratory research project*, or the gathering of information about the community that is directly useful to the community;
2. *voluntary service work* project, including work experience that involves helping other people;
3. *action research*, which involves taking a stand and then trying either to redress injustices or to prevent injustices from occuring.

Cole (1974) suggests that students compile a list of ways of bringing about change in the policy of the government or of club or group. Such techniques may be used in action research or in later life. The list may include:

- Write a letter to the editor of the local newspaper (public opinion can be influenced this way).
- Write to a business or company (company policy is often influenced by community reaction).
- Write to an elected or appointed governmental official or agency of government (these people are affected by citizen input).
- Send a letter of support to someone doing something you admire. (Everyone needs to know that his or her actions are recognised.)
- Write to an organisation working for your cause and ask to be placed on the mailing list.
- Attend meetings of organisations working for your cause.
- Ask your club, organisation or group to have a meeting on the topic of your greatest concern. You can help organise the meeting with the program chairperson.
- Organise a club or group to work on the problem of your concern.
- Distribute leaflets in the public places or door to door.
- Wear a button.

- Circulate a petition. (Officials take notice of group statements.)
- Make an appointment to interview persons in business or government who are in a position to make changes.
- Contribute time and/or money to an organisation supporting your position.
- Take part in picketing or demonstrations and peaceful marches.
- Speak up for your point of view at home or among friends.

## PERSONAL DEVELOPMENT APPROACHES

Inquiry strategies are, of course, aimed at personal development as much as at facilitating judgements about conditions external to the person. However, various strategies may focus more directly on the 'inner person'. The relevance of such strategies to environmental care may appear doubtful but people act according to the way they think and feel about themselves (Glasser, 1965) and, conversely, the environment influences the way people think and feel about themselves. Environmentally destructive acts may be a consequence of low self-esteem in association with, or perhaps independently of, a lack of knowledge about what actions are harmful to the environment. Unrelated as it may at first appear, then, an adequate self-esteem and, thus, an adequate 'pastoral care' (a rose by any other name . . .) scheme may be a vital first step in improving the quality of the biophysical as well as the social environment.

The importance of self-esteem is argued beautifully by Powell (1974). Most people do not love themselves, particularly in a society that makes its rewards and affections conditional upon productivity, action, appearance or upon doing what is expected by others. Conditional love may begin with the conditional messages of parents ('If you are quiet . . ., if you eat your dinner . . .'). The tactic is used often by the school: compliance is rewarded, difference and 'failure' are penalised. The employee, too, becomes a unit of production. Ask 'Who are you?' and most people will give a job as the reply. People learn that they are of no intrinsic worth. Advertisers of products and services create or exploit feelings of inferiority or inadequacy, and then present certain goods or services as the means to happiness or the source of happiness.

The conditions to be met in order to acquire and retain love or recognition are too great. One achievement is followed only by the demand for yet another. Feelings of failure lead to self-hate for not being able to earn self-esteem or love. Yet deserved love is accompanied by the fear that it could disappear, that one is not loved for oneself but only because one pleases, i.e. not loved at all but used.

### Incidental or implicit curriculum

Probably one of the most important methods for the development of attitudes and values is the implicit curriculum of the school. Staff need to be aware of the effect of their own behaviour, both in and out of the school. The teacher will be model. Staff need therefore to examine all school rules, conventions and traditions, as well as the school grounds and buildings and seek to determine the values they imply or 'teach'. These values may or may not be consistent with the stated intentions of the school. Hopefully, sound amendments will be made so that the school is seen to be placing value on environmental conservation and the consideration of, and involvement in, environmental issues. Hopefully, too, the school is a place that affirms the worth of each student, and does not, for example, overtly or covertly use streaming, setting or other groupings of students that are offensive to self-esteem as well as being ineffective for learning and development.

### Reality Therapy

Glasser (1965) indicates a strategy to raise self-esteem. Very briefly, it involves:

- Teacher establishes a warm, positive group involvement.
- Teacher or students establish the problem for discussion. The concern is with present behaviour, not with the past, with emotion or with causes.
- Teacher encourages the student to make a personal value judgement of his or her own behaviour. The teacher is non-judgemental and each student is responsible for the diagnosis of personal behaviour and for the rejection of irresponsible behaviour in himself or herself and in other people.
- Teachers and students identify alternative courses of action and the teacher assists the student to select a better course of action.
- Teacher encourages the student to make a commitment to action.
- Teacher and student exercise discipline with the teacher accepting no excuse for non-performance.

Glasser insists also that a successful identity requires school work that is relevant to the self, society and the real world, and that involves the student in inquiry, thinking, or problem solving. It is particularly valuable if thinking involves co-operation between people since this leads to learning that all people have learning difficulties and that many problems do not have right answers.

In sum, Reality Therapy is based on the proposition that three principles must be observed if persons are to raise their performance and satisfy their basic human need for a successful identity.

1. *Reality*, or doing what is relevant.
2. *Responsibility*, or doing what gives a feeling of self-worth and a feeling of being worthwhile to others. (Responsibility is the fulfilment of one's own needs without depriving others of the ability to fulfil their own needs.)
3. *Right*, or the moral adequacy of the decision. (The individual is obliged to set, evaluate and maintain standards of behaviour in order to establish self worth and successful identity. Glasser stands apart from the traditional psychotherapies which avoid morality; he sees standards of behaviour as part of reality and self-worth.)

Each person needs to be loved and to love, and each person needs to feel worthwhile in himself and to others. Love and worth usually go together, but not always. Thus, Glasser states that overindulgence is love without discipline and this destroys the development of responsibility and impairs self-worth. Each person needs to set, evaluate and maintain a standard of behaviour. To do this, students needs to learn to correct themselves when they go wrong, and to credit themselves when they do right. Failure to establish a sense of personal worth means suffering as acute as when there is a failure to love or to be loved.

## TRANSACTIONAL ANALYSIS

*(Harris, 1973, Freed, 1976)*

Transitional Analysis assists in the revelation of hidden or repressed emotional influences on behaviour and permits the development of greater self-control or autonomy. It is a central proposition of Transactional Analysis that our behaviour is influenced heavily by our past, and that everyone has deep feelings of inferiority (or, 'not OK') which hinder the development of the person. Being 'OK' means that the individual has greater control of his or her life instead of being paralysed by his or her faults.

The four basic positions are:

1. *I'm not OK*, the usual position of the 5 year old. The youngster is dependent on others and has a strong need for approval. To be stuck in this position is to feel inferior to others, to be jealous, highly ambitious or seeking of approval, depressed or in despair.
2. *I'm not OK — You're not OK* develops if the child is not given sufficient love ('stroking'). The position is withdrawal because love has been withheld.
3. *I'm OK — You're not OK* is a further movement usually as a result of being maltreated. It is a vindictive attitude: 'you're gonna pay!'
4. *I'm OK — You're OK* is a position that requires a conscious decision based on thought, trust and action. To make such a choice, there are three components of our personality that need to be considered:

*Parent:* the parental component is a composite of all the messages recorded in us during the first few years of life. The parent is reflected in behaviour or messages are fixed, rigid, dogmatic, critical, inhibiting, although some messages may be affirming or supportive. Typical parent words are 'should', 'always', 'never', 'if I were you . . .' 'it must be done this way . . .', and the tone is commanding or condescending.

*Child:* the child component is whimsical, naive, enthusiastic, spontaneous, creative, emotional, and yet it tends to be primitive and self-depreciating too. Typical child words are 'I want', 'I need', 'I can't', 'I don't know', 'I don't care', 'give me . . .', and the expressions include pouting, sobbing, shrieking, whining, laughing.

*Adult:* the adult component is the rational, mature, flexible, decision-making area. The adult has the task of reviewing the parental messages and the whimsies of the child, and making decisions in the light of reason and mature values. Early in life, we are incapable of making such judgements since everything said or done to us is accepted as those true or necessary. The adult component is the conscious control of the person's own life. The adult welcomes the wisdom of the parent and the wonder, creativity and enthusiasm of the child.

With some help, students can learn the Parent-Adult-Child analysis of their interactions with other people and develop greater autonomy as persons.

## OPEN DISCUSSION WITH INDIVIDUALS OR SMALL GROUPS *(Powell, 1974)*

The focus of such discussion may well be the feelings or emotions of those involved. One means of enabling the free flow of personal ideas and feelings is simply to encourage an individual to contact his or her emotions deeply and to talk freely about them. Do not interrupt, correct grammar, point out illogicalities, make scholarly remarks or otherwise make judgements of the student such as through prejudice, moralising, assumption of your own emotional or personal superiority and so on.

Be attentive or concerned and empathic. A dialogue may be encouraged by asking about how the student describes himself and the influences on his life, and by asking about the specific events or contexts that stimulate the emotion or feeling. This information may be regarded as background to encouraging honest talk of the emotion itself. You may encourage the individual to identify clearly the feelings, and only later to explore possible explanations until the true emotion has been identified and explained.

## SOCIAL TRAPS ANALYSIS *(Platt, 1973)*

*Sometimes a person or group becomes involved in a situation that later proves to be unpleasant and yet there seems no easy way out. These situations are 'social traps', for example:*

- *Individual advantage — long term loss:* An individual may be advantaged by grazing his cattle on the Commons but as the number of cattle and owners increases, the grass is destroyed and the owners experience a collective loss. The trap is that the individual continues to do something for individual advantage that eventually is damaging to the group as a whole.
- *Present individual disadvantage — long term gain:* People may watch a murder (as of Kitty Genovese in New York) and not call the police. The spectators wished not to be involved, or feared reprisals, or were simply struck by the spectacle. Individual advantage prevented people from acting for the benefit of the group.

### Types of traps:

Key
S — stimulus or environmental situation
B — behaviour
R — result
R+ — a positive result, that makes the B more probable whenever the particular S occurs again.
R- — a negative result that makes the B less probable the next time the S occurs.

A *social trap* occurs when there is an opposition between the short term reward or punishment ($R_S+$ or $R_S-$) and the long-run consequences ($R_L+$ or $R_L-$). Thus, the first example given above is a case of:

S B $R_S+$ . . . $R_L-$ (trap)

The second example is a case of: S B $R_S-$ . . . $R_L+$ (countertraps or fence)

*Reversals of reinforcers* can be applied to group-individual traps, i.e. *personal* (P) reward or punishment is in opposition to collective or *group* (G) advantage or disadvantage, thus $R_p+$ $P_p-$, or $R_G+$, $R_G-$. There may be traps or fences depending on whether the initial result is positive or negative.

There are many combinations of traps and fences (about forty are clear), but the main classes are:

### 1. One Person or Self-Traps

(a) *reversal of reinforcers after time delay*, i.e. $R_s+$ changes to $R_L-$, as in the smoking of cigarettes.
(b) *countertraps* or fence is where $R_s-$ changes to $R_L+$, as in saving money now for old age, or living on scholarship for the sake of higher qualifications and more money later.
(c) *ignorance of unexpected or reversed outcomes* e.g. the person handling a gun that discharges killing a friend. The person 'didn't know the gun was loaded'.
(d) *sliding reinforcers:* The reinforcers change steadily as the behaviour is repeated so that it becomes less and less rewarding and in fact punishing. The habit may persist in the hope that good results will return. This is one aspect of drug addiction. Even certain foods may lose that 'magic taste' if they are consumed too often.

### 2. Missing Hero Trap

When group profit ($R_G+$) is blocked by $R_p-$ for any personal action, there is a missing hero trap. For example, a large package falls off a truck. Cars bank up and change lanes to move around it. Drivers far back in the line do not know about the problem and cannot help. Drivers close to the spot are concerned only with getting past as soon as possible, not with possibly endangering themselves to move the package, let alone 'waste more time'.

Other examples are the reluctance of people to testify in criminal cases, e.g. against the Mafia, the lack of willingness to contact the police to report a crime (as with Kitty Genovese). 'We need continuing positive reinforcers for brave and intelligent initiative' (Platt, 1973, 45) yet news cover (etc.) often goes to the infamous.

**3. Collective Traps** (individual good, collective bad)

Such traps occur when $R_G$- follows only because of an excessive number of $R_p$+ practitioners, as in the common grazing land problem. There are various other situations in which the person working for the public good $R_G$+ experiences $R_p$- through others taking advantage of him. There are also many situations where a small $R_p$+ outweighs the long run $R_p$- and $R_G$-, e.g. drug addiction, the arms race.

### How to get out of traps

A central thesis of behaviourism is that the reinforcement relations determine behaviour, not some instinct of people or decisions made in the historical past, etc. Thus, it is suggested that there are six clear ways out of traps:

1. *Change the delay*, or convert long-range consequences into more immediate ones, e.g. warning on cigarette packets. Schools may devise all kinds of rewards for performance in order to make the long run pay off more visible, e.g. competency tests, work experience.
2. *Add counter reinforcers* such as punishments or social incentives, to change behaviour through their immediate effects. This is supposed to be the main purpose of harsh laws. A combination of taxes and incentives has brought about changes to reduce pollution and promote civil rights.
3. *Change the nature of the long run consequences, $R_L$-* — such as by new inventions or improved design, improved planning or even by changes in the law.
4. *Add $R_s$+ + for competing behaviour* which will not lead to the bad long-range consequences, e.g. smoke a pipe not cigarettes, read ten pages before giving yourself a reward. Find the reinforcer that works for you until regular study habits are established. A teacher may try various management methods, etc.
5. *Get outside help to change the reinforcement patterns.* A delinquent may get reinforcement for his behaviour by the attention he gets from being chastised, the excitement of being sought by police, the admiration of peers and so on. The delinquent is 'locked in'. A solution is to find a person to see the child very often and to give the child immediate reinforcers (such as marks) for increased attention, for reading (etc.) with X marks entitling the child to a trip to the country, etc. The effort needs to be maintained until the child is being widely praised or rewarded for more satisfactory behaviour.
6. *Set up a ruling or superordinate authority* to decide the allocation of resources, mediate conflicts and so on. Such a solution goes beyond the simple use of an outside agency and is exemplified in bodies such as the European Common Market, the International Whaling Commission, and so on.

*Nested traps* are much more difficult to solve than the simple ones depicted above. Platt indicates that violence in the media is very common and that it leads people to believe that this is the only important kind of news or drama and that real war is another TV spectacular. The situation becomes self-maintaining, especially as the media seeks higher ratings or greater sales and more profit.

Gang behaviour is also 'locked in' at several levels — each member is reinforced by the gang for criminal behaviour. It is reinforced, too, by the excitement of crime and of avoiding police, and by the 'investment' already made in crime whereby it is very costly to give up crime and marginally easier to continue in crime. The gang may be protected by the adult neighbourhood, and may link with other gangs.

Classroom materials have not been developed concerning social traps but the method of analysis may be valuable for some teachers in some circumstances. Unlike the other approaches, it is a particularly hard approach.

## VALUES CLARIFICATION

Values clarification proposes that values education occurs when students choose freely from alternatives after thoughtful consideration of the consequences of each alternative. Furthermore, students should prize their choice, be willing to affirm it publicly and act on it repeatedly (Raths *et al.*, 1968). Apart from Raths, further resource material for classrooms is in Simon *et al.* (1972).

### Life Goals

Life goals setting is based on the theory that most people want to live fulfilled lives in a high quality environment. Assisting a student to set life-goals and schedules may thus be valuable. However, instruction would be on an individual basis.

### Cognitive dissonance

The teacher using this approach will try to bring out inconsistencies between the statements of a student and the actual behaviour of the student.

The teacher seeks deliberately to confront the student with inconsistencies. The theory maintains that people will change values and attitudes or behaviour when faced with an inconsistency.

### Moral development

Supporters of this approach believe that there is a universal, invariant sequence in moral development, and that certain teaching strategies assist in development. Kohlberg has proposed by use of moral dilemmas to move persons to higher stages of moral development. However, the theory concerns moral thinking, not behaviour, and it has by no means yet been established empirically that there are stages of development (e.g. Kurtines & Grief, 1974). Philosophically, the structure has also been challenged. Nevertheless, appropriate moral dilemmas could be written and used for environmental education and without attaching their use to notions of moral developmental theory.

### Field camps

Field camps appear to have enormous potential as a setting for influencing values and attitudes, almost regardless of the explicit strategies or lessons. A camp that is in a remote area without benefit of the media may facilitate the development of consciousness which could be exploited by various of the strategies and techniques listed in this paper.

Within the context of inquiry strategies and also for the personal approaches, various data-gathering techniques could be used either by students or to gather information about students, e.g. Likert scale, Semantic Differential, Rating, Ranking, Q-sort, Delphi, Pair Comparisons, Sentence Completion, Cognitive Maps, Decision Matrix, and various others. Various teaching methods could also be valuable in dealing with controversial issues and values education including debate, devil's advocate, simulation (role play, and operational games), adversary evaluation and syndicate groups.

Persons interested in further ideas may consult, initially, Superka (1976). The text is a guide to resources in values education and classifies approaches as inculcation, moral development, values analysis, values clarification and action learning. Each approach is explained and some teaching methods indicated and illustrated. The book contains also an annoted bibliography for further reading.

## INDOCTRINARY APPROACHES

### Moralising

The teacher may urge the student to 'improve' or to behave in accordance with specific rules or moral precept. Such an approach is not likely to be effective.

### Conditioning

Conditioning, or the extrinsic rewarding of successive approximations of desired behaviour, leads to desirable changes in behaviour. However, some critics warn that some students may behave as desired only in order to obtain the extrinsic rewards (e.g. higher grades, praise, prizes, etc.) and not because they believe in the worth of the behaviour itself.

## CONCLUSION

Whatever approach, or approaches, is used in dealing with controversial issues or values education, teachers should employ a thorough knowledge of the basic principles of learning and teaching. Even so, there are no hard and fast rules as to when to use what approaches for which particular students. Teacher intuition and the ability to detect and to manage individual differences remains essential.

There are many approaches to controversial issues and to attitudes and values, including inquiry strategies action research projects, personal development techniques, including the structure of the implicit curriculum, and indoctrinatory approaches. Each of these approaches may incorporate a great many techniques of teaching, investigation, data-gathering, group work, presentation, and evaluation.

## REFERENCES

Blachford, K.R. (1971), 'Values and geographical education', *Geographical Education,* 1, (3).

Cole, R. (1974), *A new role for geographical education: value and environmental concepts,* National Council for Geographical Education.

Freed, A.M. (1976), *T.A. for teens and other important people,* Jalmar.

Glasser, W. (1965), *Reality Therapy,* Harper and Row, New York.

Harris, T.A. (1973), *I'm O.K. — You're O.K.*, Pan Books, London.

Holmes, M. (1976), 'Moral education — what can schools do?' *Interchange, 7, (1).*

Kurtines, W. and Greif, E.B. (1974), 'The development of moral thought: review and evaluation of Kohlberg's approach', *Psychological Bulletin,* 81, (8).

Mills, J.S. (1910), *Liberty Utilitarianism and Representative Government,* Dent, London.

Newmann, F.M. (1975), *Education for citizen action: challenge for secondary curriculum,* McCutchen.

Platt, J. (1973), 'Social traps', *American Psychologist*, Aug. 1973, 641-651.

Powell, J. (1974), *The secret of staying in love*, Argus.

Raths, L., Harmin, M. & Simons, S. (1968), *Values and teaching*, Merrill.

Reich, B. & Adcock, C. (1976), *Values, attitudes and behaviour change*, Methuen.

Simon, S.B., Howe, L.W. & Kirchenbaum, H. (1972), *Values clarification handbook*, Hart.

Stewart, J.S. (1975), 'Clarifying values clarification, a critique', *Phi Delta Kappan*, 16, (10).

Superka, D.P. *et al.* (1976) *Values Education Sourcebook: conceptual approaches, materials, analyses, and an annotated bibliography*, ERIC Clearinghouse for Social Studies/Social Science Education and Social Science Consortium, Boulder, Col.

# *DEVELOPING SCHOOLGROUNDS FOR ENVIRONMENTAL EDUCATION*

*J. H. Smith*
*J. R. Wilson*

---

## PREAMBLE

Environmental education requires children to go out of doors. Schoolgrounds are the nearest and cheapest outdoors for classes to visit and yet they are often overlooked. The authors of this article hold the view that the careful development of the schoolgrounds creates a rich and valuable resource—the school's own environmental study area—and, for those teachers interested in developing their schoolgrounds for environmental education, they outline the major planning steps as well as the major features which have to be considered if the schoolgrounds are to be developed in ways that reflect the wishes of the total school community.

---

## INTRODUCTION

> The child needs to learn what lives in the water, what lives in the air, what lives on the earth, and how human beings are related to these growing, living, singing, fighting and playing creatures. Any environment is crippling if it cuts the child off from such experiences (Mead,1972, p. 249).

Children are stimulated by the outside world by the living things, the buildings and the people that surround them. This inherent interest should be seized on by getting children out of the classroom and into the outdoors. Children learn best by doing but theoretical study in the classroom is their major learning experience. Too often their education is sucked dry of 'real' experience. The nearest outdoors to the classroom are the schoolgrounds. They are easily accessible, there is no cost involved in getting there, and yet they are usually poorly developed from an educational point of view. As they are part of the school they can be developed by the school for its own special use.

Schoolgrounds can serve a variety of purposes, including:

- the children's recreational needs
- the teacher's educational use
- an example to the community of the values of aesthetics and conservation of the environment.

Well designed and developed schoolgrounds can serve all these purposes. For example, plants needed for study purposes can also be selected to enhance an otherwise harsh, drab building. Plants can provide colour and shade, a variety of shapes, and a range of levels to relieve flat expanses. Dense planting of bushy species can reduce wind velocity and outside noise which may help in lowering distractions and discomfort.

This document outlines the broad steps needed to realise the potential of a school's grounds. Specific information on such things as helpful organisations, suitable plants, resource personnel, and available funds is not given as these vary from school to school.

## WHERE TO START

If you feel that something needs to be done about your schoolground, and you are willing to do it, then start by finding out who else on the staff is interested and willing. It may be best to form yourselves into a working party, 'The Grounds Committee', and so tackle the problem formally. The purpose of this committee would be to gather information and ideas on the development of the schoolgrounds, organise these and present them as a range of possible options. To ensure that ideas and options are representative of the school body, membership of the Grounds Committee could include an elected or nominated body representing students, staff, parents and the general community. Another alternative may be to call in an adviser or consultant from outside the school who has expertise in the development of schoolgrounds. Such a person can stimulate interest, help overcome problems caused by vested interests, and give a fresh approach to the scheme.

Once established, the committee should gather all relevant information on the whole school site. Various classes in the school could be asked to help. Past school plans which show the entire site, buildings and major service lines of water, gas, sewer, telephone and power are an essential information source. Site plans which show the contours of the grounds should also be obtained. A comparison of present and future plans should indicate the school's trend of development. Future plans should be checked through the relevant Departmental agency. Details should also be gathered on the site's soil type. It is easily eroded, suitable for tree planting, easy to work? Information on the local vegetation will help in the selection of suitable species for future planting. Old residents in the area can be most helpful on this topic. Data on rainfall, temperatures and prevailing winds are important for determining the location of activity areas as well as selection of suitable plants.

The working party should also look at how the site is used. What is the student traffic flow? What are the main play patterns? Are the grounds used by the community for weekend sports?

It is also important to assess problems faced by the school at present and those anticipated in the future. Common problems may be those relating to size of grounds, vandalism, lack of use, apathy, staff turnover and maintenance of grounds during vacations.

Possible sources of assistance should be investigated—for example, the school itself, parents, local councils, community groups, the education authority, government departments, and local industries. Steps can be taken to start local fund raising activities. Some organisations provide funds as a matching grant, dollar for dollar. Try to discover parents who can help offset costs such as nurserymen, earthmoving equipment operators, bricklayers, truckdrivers, landscapers or parents prepared to work on the site. Many may just wish to contribute to fund raising activities and these can commence immediately.

The major task in all the preliminary planning is the collection of ideas for the development of the schoolgrounds. Children should be contacted first for the success of any developments will be determined by them. They will always be the major users.

## IDEAS TO CONSIDER

The following ideas are those which could be used to develop schoolgrounds for environmental education. They relate specifically to playscapes, parks, plants, animals, water, and outdoor classrooms. Other aspects, particularly those catering for active recreation and movement of people, will also need to be considered when planning. As information on their needs is readily available, it is not included here.

### Playscapes

Play is a voluntary, spontaneous activity carried out as an end in itself. Nevertheless the products of play—the development of physical skills, social skills, imagination, understanding, the senses—are important outcomes to the educators. Play can be used by the environmental educator to develop an awareness of different sounds, smells, colours and textures, to help discriminate between similar elements of the environment and to encourage a love of the outdoors. However, this will require a radically different approach to playgrounds as we know them, perhaps development along the lines of the adventure playgrounds of Europe:

> An adventure playground is a place where children of all ages, under friendly supervision, are free to do many things they can no longer easily do in our crowded urban society: things like building—huts, walls, forts, dens, tree-houses;. . . tree-climbing, digging, camping; perhaps gardening and keeping animals; as well as playing team and group games, painting, dressing up, modelling, reading—or doing nothing. For it must also be a place where children just meet and talk in a free, relaxed atmosphere. They do not have to pay to enter, nor do they join as members. They just come to the playground whenever they feel like it (Children's Environments Advisory Service, n.d.).

Watch how the children in your schoolyard play and note how they use elements that are fixed, rigid, flexible, movable, simple or complex. If that sets you thinking in terms of

*In their play, children use elements that are fixed, rigid, flexibile, movable, simple, or complex.*

pieces of equipment for play then go back a step and think in terms of unstructured elements such as planks, pipes, logs, tyres, tubes, hessian, bags, ropes, cables and the like. Now go back another step and think in terms of natural elements like hills, trees, bushes, animals, water, soil, sand, rocks, wind and sun. If you are going to provide more than the natural elements on the sites (and that is usually necessary because of the flat openness of most school sites) then it is important to try and anticipate the many ways children might use what is provided. Just watch how an uninhibited group use a slippery dip and you'll get the idea!

Safety and supervision, shelter from sun, wind and rain, pathways for movement, sensory appeal of colour, shape, texture, smell, sounds, storage, drainage, and maintenance, not to mention cost, must be taken into account as well as the need for the delineation of active, quiet, individual and group play areas. Planning is important.

Playgrounds are living things and so the dividing line between construction and maintenance must remain a subtle one.

## Parks

The wide open spaces of lawn and bitumen, common in most schoolgrounds, are not usually conducive to privacy, contemplation, communion with nature, or stimulating the imagination for drama, English, film making or art. A park-like area of variable light, shade, and texture can provide a background for formal studies as well as for an individual's personal development. Trees can be planted that are important to Australian history, to local folk lore, in woodworking and in science and geography courses. Others can be provided to encourage animals that in turn enrich the study potential of the schoolgrounds. A useable area that is also a place of beauty may attract other members of the community to walk, sit or picnic in it—and that could have advantages in discouraging vandalism in the school.

## Plants

*Trees* are important in playscapes for climbing, swinging, balancing and jumping, but can also be used to modify the climate in different areas of the grounds. As a windbreak they need the help of smaller bushes to prevent eddies and broken tree limbs in high winds. As a sun filter they can be used to catch the high summer sun but let the low winter sun through. Trees also catch dust, noise and water, produce oxygen, alter the humidity, and prevent erosion. They also create visual effects by defining areas, providing backdrops, hiding views and entertaining children who look out of windows.

*Shrubs and Bushes:* How many different smells can you remember? Aromatic shrubs and herbs can be spread throughout the grounds, collected in a special scent garden, or used as pot plants in foyers and on window sills.

*A park-like area of variable light, shade and texture can provide a background for formal studies as well as for an individual's personal enjoyment and development.*

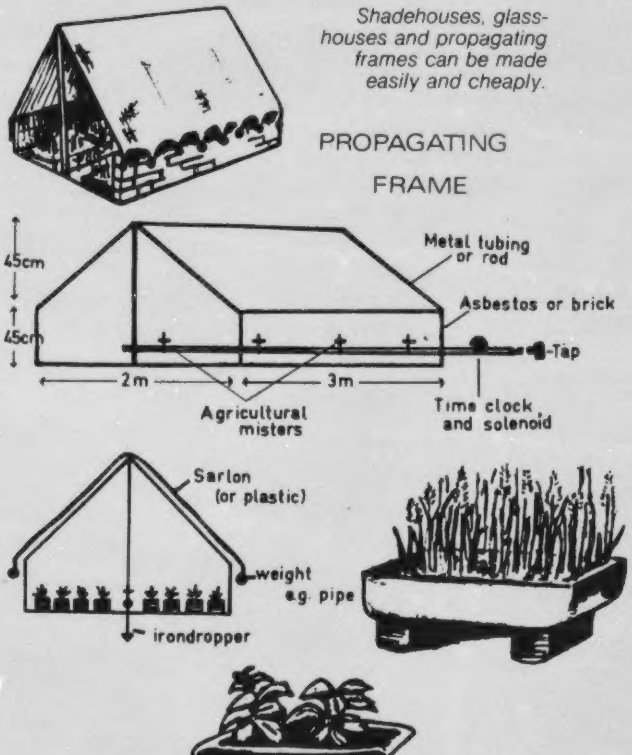
*Plants create visual effects by defining areas, providing backdrops, hiding views, and entertaining children who look out of windows.*

*Gardening provides tangible rewards to children for their efforts.*

How many green colours can you differentiate between? Do native plants flower throughout the year? What do pollen-eating birds do when there are no flowering plants about? What colour flowers attract moths in the night or butterflies in the daytime? A careful selection of shrubs and bushes can stimulate children to ask such questions—and provide answers for the observant ones.

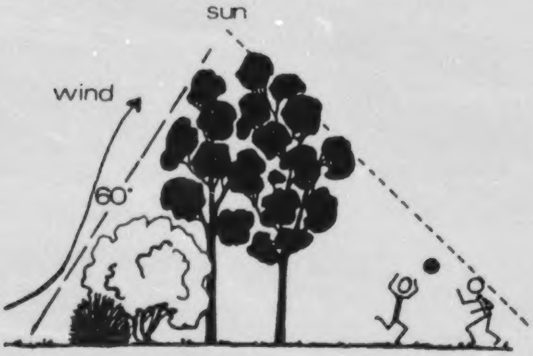
*Smaller Plants:* Food plants grown in vegetable plots give children a chance to experience the seasons and the complexities of the soil, as well as rewarding them for their skills. Gardening can be done in conjunction with a compost heap that takes the lawn clippings and canteen and lunch scraps and turns them into plant nutrients. Plants needed for social studies, geography and science lessons such as rice, wheat, maize, peas, geraniums, mosses, ferns, liverwort or algae can be grown in special laboratory gardens in special areas of the school ground, depending on the climatic control needed for successful growth.

*Shadehouses and Glasses:* These can be made cheaply and are very useful in controlling temperature and humidity for the germination of seedlings, the striking of cuttings, and the growing of special delicate plants. These are best located in suitable courtyards between the school buildings.



*Shadehouses, glass-houses and propagating frames can be made easily and cheaply.*

*Trees act as a windbreak and a filter for sunlight.*



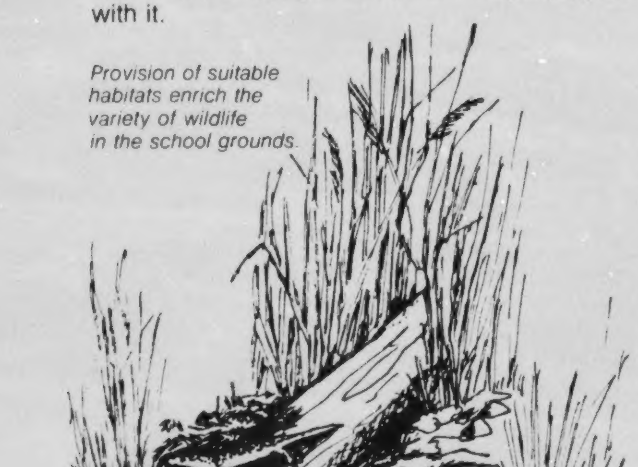
Ground cover plants keep temperatures down, stabilise moisture content, suppress weeds, prevent erosion, all colour, attract insects, and provide a habitat for lizards.

Some schools are fortunate enough to still have pockets of the 'original' communities of their districts.

*Groundcover:* Plants in schools are often limited to grasses, even where a durable playing surface is not essential. This can be costly in water and time for maintenance. Over two hundred species of groundcover are available. These help keep ground temperatures down, while they stabilise moisture content, suppress weeds, prevent erosion, add colour, attract insects, provide a habitat of lizards and so on.

## Animals

There are many valuable educational experiences to be gained by the keeping of animals at school. These experiences can provide children with opportunities to observe animals close at hand, to understand their needs and behaviour, to observe birth, life and death, and to develop feelings towards them. A result of this may be to encourage children to realise the needs of animals in the wild for a suitable habitat and that once this is destroyed the animal may disappear with it.



Provision of suitable habitats enrich the variety of wildlife in the school grounds.

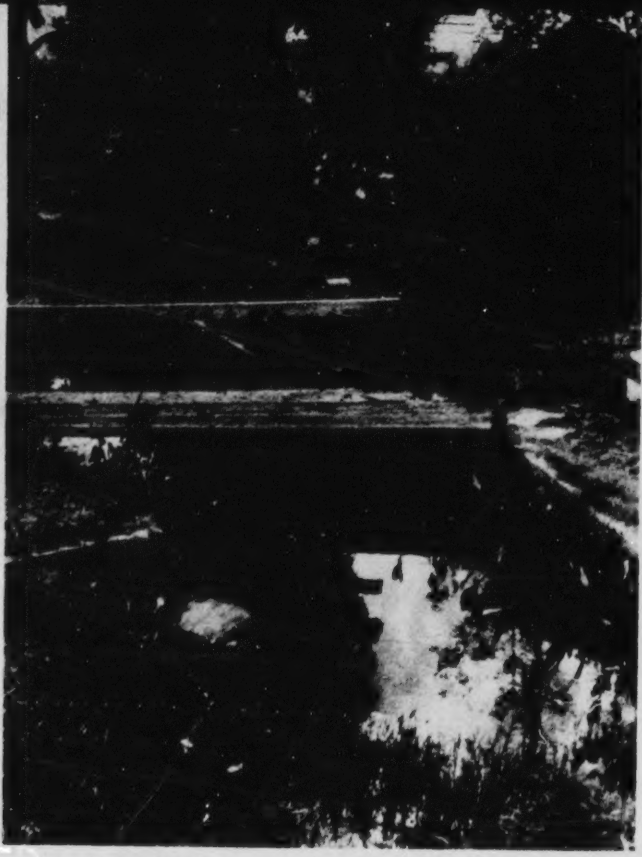
Animals kept in the schoolgrounds—and that can include sheep, goats, chickens, frogs, lizards, tortoises, mice, and so on—require maintenance. If this is recognised and suitable arrangements can be made to ensure their well-being, especially over weekends and holidays, then the keeping of pets in schools can be a valuable activity.

There is, however, another way of keeping animals, even ones such as possums, sugar gliders, hopping mice, magpies, parrots, willy-wagtails, honey-eaters, lizards, tortoises, frogs and insects, and that is to provide suitable habitats, sufficient food sources and protection.

*Communities:* The stability of a natural community usually increases with the degree of complexity it contains. The interactions between living organisms, as well as the life-style of individual organisms, can form the basis of short and long term studies in both primary and secondary schools. Not only can communities be used to study such things as ecology, animal behaviour, classification, they can also be a source of inspiration in art, dance, drama and language development.

## Water

Runoff from roof and surface water of schools can be dammed and the dam used for the study of water life, for aquaculture (fish, yabbies), as a haven for water birds, or a setting for the simulation of water erosion at beaches and along creeks. Ponds can be used as reflecting pools to invite meditation, to protect special features, to enhance sculptures and to float things in. There is another possibility for surface water on a school site. Once water is stored, the wind can be used to pump it up over special



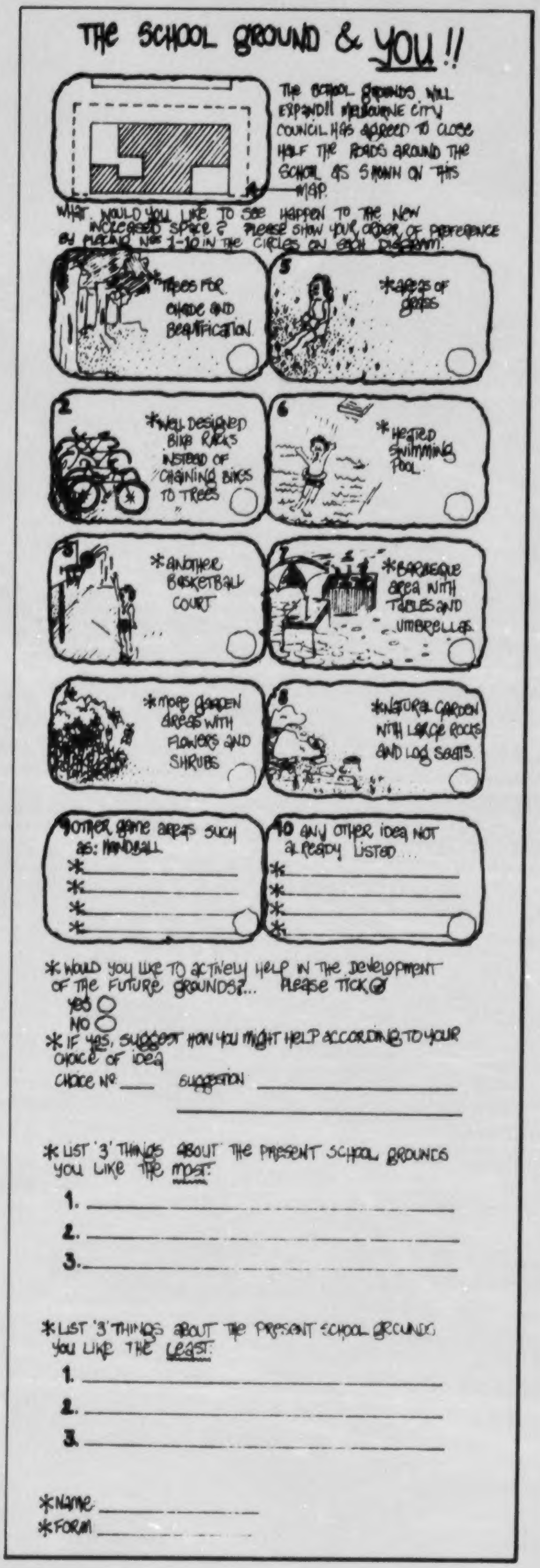
*Ponds provide an extra dimension for study.*

walls and windows, over musical sculptures and back to the storage point. The movement of water only when the wind is blowing can reinforce the rhythms of the day and season.

### Outdoor Classroom

Courtyards, amphitheatres, and observatories for astronomy or weather are other features that can be considered in the development of schoolgrounds. Although each may have its special function and hence requirements, multipurpose usage is desirable and should be planned for. The following description by A. Grossard of the development of an ecology centre at Kew High School, Victoria, is indicative of the possibilities:

'Many schoolgrounds contain areas which are not used, either because they are remote, noisy, or just unattractive. Such unproductive areas can be turned into valuable teaching and recreational facilities useful both to students, staff and community, appealing and aesthetically pleasing at the same time. In an inner suburban area in Victoria at Kew High School, where most of the school area is taken up with asphalt and buildings, an unused part of the grounds has been rejuvenated and developed into an Ecology Centre.



THE SCHOOL GROUND & YOU!!

THE SCHOOL GROUNDS WILL EXPAND!! MELBOURNE CITY COUNCIL HAS AGREED TO CLOSE HALF THE ROADS AROUND THE SCHOOL AS SHOWN ON THIS MAP.

WHAT WOULD YOU LIKE TO SEE HAPPEN TO THE NEW INCREASED SPACE? PLEASE SHOW YOUR ORDER OF PREFERENCE BY PLACING NOS 1-10 IN THE CIRCLES ON EACH DIAGRAM.

1 *TREES FOR SHADE AND BEAUTIFICATION ○

5 *AREAS OF GRASS ○

2 *WELL DESIGNED BIKE RACKS INSTEAD OF CHAINING BIKES TO TREES ○

6 *HEATED SWIMMING POOL ○

3 *ANOTHER BASKETBALL COURT ○

7 *BARBEQUE AREA WITH TABLES AND UMBRELLAS ○

4 *MORE GARDEN AREAS WITH FLOWERS AND SHRUBS ○

8 *NATURAL GARDEN WITH LARGE ROCKS AND LOG SEATS ○

9 OTHER GAME AREAS SUCH AS: HANDBALL

*________

*________

*________

*________ ○

10 ANY OTHER IDEA NOT ALREADY LISTED...

*________

*________

*________

*________ ○

*WOULD YOU LIKE TO ACTIVELY HELP IN THE DEVELOPMENT OF THE FUTURE GROUNDS?... PLEASE TICK ☑

YES ○
NO ○

*IF YES, SUGGEST HOW YOU MIGHT HELP ACCORDING TO YOUR CHOICE OF IDEA

CHOICE NO ____ SUGGESTION ________________

*LIST '3' THINGS ABOUT THE PRESENT SCHOOL GROUNDS YOU LIKE THE MOST:

1. ________________
2. ________________
3. ________________

*LIST '3' THINGS ABOUT THE PRESENT SCHOOL GROUNDS YOU LIKE THE LEAST:

1. ________________
2. ________________
3. ________________

*NAME ____________

*FORM ____________

'The Centre was designed as a means of promoting scientific study and research in true-to-life natural surroundings, where students actually observe inter-relationships between plants and animals, perform microscopic work and carry out research projects, sometimes over a year's duration.

'Three different ponds were created to provide opportunity to study ecology over four seasons. A deep freshwater pond breeds various fish and other small animals and grows deep rooted plants. A shallower freshwater pond is used mainly for the growth of invertebrates, plankton and small plants, while in contrast to these two, a third pond has been established as a marsh area.

'One obvious result has been considerable saving in travel costs for excursions and purchasing biological materials. But more satisfying still is the versatility and usefulness of the Centre as demonstrated by the ways in which it is used by each faculty.

'The drama class uses it to perform one act plays adapted around the natural setting, geography students work on contours, erosion and land development, art uses the Centre for drawing and sculpturing, and English for promoting discussion groups. The woodwork classes use the Centre as a means of teaching techniques involved in mass production and students manufacture name plates for trees, inscribing both botanical and common names and the name of the donor.

*'Students manufacture name plates for trees, inscribing both botanical and common names'.*

'Finance for the Centre came from the School Council, fundraising, donations and a Schools Commission grant. Ideas were gleaned from teachers, students, and community people interested in landscaping. Detailed plans were costed and assessed, and the work carried out in stages. Two weeks of subcontracting saw the heavy manual work involving ponds, bridges, seats, completed, and students performed the rest. In three weeks Year 7 to 12 students had moulded hills and gullies, removed weeds and rubbish, applied mulch, and sown grass. Ground-covers were used to reduce weeding and maintenance. People who donated trees, planted and staked their own.

'Because the Ecology Centre is used continuously throughout the year supervision became essential. This is undertaken by senior students. The lack of vandalism, growing respect for the fauna and flora and the students' obvious appreciation of their Ecology Centre was gratifying. Indeed the transformation of this once unused, unproductive area into such a Centre which is both appealing and widely used educationally, is proving a very worthwhile experiment indeed and an indication of what may be done in other schools.'

## OTHER CONSIDERATIONS

There are a number of other considerations besides formal education and costs, that ought to be taken into account when planning your schoolgrounds.

### Visual Considerations

A school landscape can be exciting if care is taken to provide a rich blend of visual stimuli. These can take many forms, from paths whose ends are hidden from view, to specimen trees whose size is highlighted by their isolation. In addition to the overall character of the landscape in which the school is situated, it is important that a balance in scale, shape and colour is achieved between the elements on the site. This means for instance that plants should be selected with habit, leaf, flower and trunk colour, position in relation to buildings and other plants, all carefully in mind.

Colours such as reds and yellows are warm, close-up colours, whereas blues and purples are cold receding colours. Such effects can be used to enlarge or reduce apparent space. As one moves through the landscape, filtered views, constantly changing vistas, and surprise elements can all add excitement to it. These are the techniques of the landscape architect and landscape gardener.

## Attracting Life

*Insects* will be attracted to most plants in the school. However, if you want to attract special insects you will need to know their food plants. For instance, Wanderer and Monarch butterflies lay their eggs on the introduced milkweed *(Asclepias sp.)*. Butterflies are attracted to small, tubular, blue and purple flowers, night moths to white, tubular flowers and bees to cup-shaped flowers.

*Birds* can be attracted by providing food, shelter and water, but each has its own special requirements and some are more tolerant of humans and noise than others. Small bush birds require a relatively small area for their feeding, nesting and social activities and may take up residence in the quieter areas of the schoolground. Larger birds may use it for occasional visits or use it regularly as they migrate across the country. Some larger birds such as owls, magpies, kookaburras and the introduced blackbirds may eat or drive away smaller birds. To increase the range of birds visiting the schoolgrounds, try and provide the following:

- tall gum trees for birds such as lorikeets that prefer to remain in the tree tops
- gum trees with lots of foliage and blossom to encourage insects and foraging birds such as honeyeaters
- dead trees or hollow logs for nesting sites
- a variable understorey with dense sections to encourage small bush birds such as wrens, chats, thornbills, and open sections with natural grasses to encourage finches and parrots
- a range of nectar producing plants to ensure flowers the year round
- water, particularly running water, with nearby shrubs and trees to act as perches

*Mammals* such as possums, bats, and even bandicoots might move into the grounds from nearby bushland areas when foraging at night. Possums can be encouraged with apples, sultanas and dry bread, and bandicoots will take fruit, sultanas and meat scraps. Bats are mostly insectivorous, catching night-flying moths and beetles. It may be necessary to add the animals of your choice when the habitat is judged suitable, e.g. Kangaroo hopping mice *(Notomys sp.)* would require an open, warm, sandy area with several rocks and logs and lots of seed-producing plants, with some access to water.

*Reptiles*, such as lizards, usually require north-facing rocks on which to sunbathe, and rocks, logs, plants or burrows to hide among. They are mostly omnivorous and eat insects, snails, and plant matter, especially fruit. They usually need water and so their habitat may need to be located near a pond.

*Frogs* can be attracted over surprising distances by the provision of a semi-permanent pond and a moist habitat around it. They eat insects and their tadpoles eat algae which can be readily grown in the pond.

Further information on the special requirements of the animals of your area should be available. Ask a biology teacher.

## Maintenance

The time cost of maintaining any new features in the grounds should be considered at the outset, particularly for those that will be used intensively and may become unsafe or unfunctional. This is not always easy to estimate and where it involves plants it will probably require the experience of a gardener. The function of the element must be clearly established so that maintenance is directed towards that function. Raking of leaves, constant watering and trimming in an area of native plants may be both unnecessary and inappropriate if the function of the area is to provide for the study of the life it attracts. Patience and acceptance of a natural order (chaos to some) may not come readily to those who are accustomed to controlling the growth of their plants.

The maintenance of the garden can have a greater effect than the initial plan. For this reason a detailed maintenance schedule is important. It can also be a useful reminder of the project aims for new personnel who may come onto the scene.

Maintenance of plants can be minimised by:

- selecting plants appropriate to your soil and climate, bearing in mind the micro habitats created by buildings and other plants
- site preparation: most plants grow best without competition from weeds. Initial deep cultivation and the use of fertilisers will encourage rapid growth of many species
- protection: from wind by thick plantings or a brush shelter (plants can become too dependent on stakes and not develop a strong root system although there is much debate on staking) protection from desiccation by use of a thick mulch of leaves, wood shavings, loose soil, gravel, plastic, paper (care) and even bitumen

- watering as infrequently as possible (careful selection of species and time of planting can mean no watering is needed especially after the first summer. Drip irrigation should be considered for those species needing watering for several years. The hotter and windier the weather the more the plant will need water. The amount retained in the soil will depend on drainage, soil type and groundcover. It is sometimes useful to plant a soft-leaved plant which wilts under dry conditions among hard-leaved native plants which give little indication of when they need water)
- planning for plants with similar water requirements to be grouped together *(a common problem with native plants is over-watering)*
- weeding: weeds are unwanted plants and so should be removed. Rather than pulling them out by hand, it may be easier to starve them of water and sunlight by planting taller plants among them, or by planting ground-cover around the edges and encouraging it to grow inwards over the weeds. Heavy mulches, plastic, old carpets and linos can also be used to keep down the weeds to give other plants time to grow
- encouraging a diverse community of plants and animals. This will help the area to a stable, climax community. However, in the early stages as it moves from a very simple community some species, particularly insects, may threaten certain species of plants. If you can, wait until you are absolutely sure no birds, spiders, or other insects are going to control the 'pest' and then remove it by hand (schools are never short of hands). If this is impractical, spray with *water* or cut off the infected section. As a last resort chemicals such as Derris Dust can be used for chewing insects and white oil or 'Meta-Systox' can be painted directly onto the bark for sucking insects. The secondary effects of such chemicals could form the basis of discussion in class.

## DECISION-MAKING

Once the working party has considered all ideas and suggestions, it faces the task of communicating them to the entire school community, giving adequate time for discussion, and then starting the difficult task of deciding which ideas, and whose ideas, should be given priority. The aim should be to come up with plans that are suitable to all those involved. This of course may be quite difficult for wishes may conflict. For instance, students may desire creative play areas that are untidy in appearance, while the principal wants the grounds to be neat and orderly. The points not to be forgotten are that the grounds should be an educational resource usable by the whole school and that, therefore, the whole school community should be involved in making decisions about them. The broad stages required to make a decision are summarised in Figure 32 and are discussed in sequence below.

**SELECTING PRIORITIES**

- Agree on an overall approach to the entire school community.
- Communicate ideas through briefings and discussions.
- Collect new ideas and priorities through questionnaires, group meetings.
- Reach a consensus: what are the major priorities expressed by all concerned?

⇩

**COSTING**

- List major items.
- Obtain quotes for labour, materials and maintenance.
- Try to offset costs with local (free) assistance.
- Determine the feasibility of the proposals.
- Plan stages of development.

⇩

**THE PLANS**

- Develop concept plans. Show alternatives as well.
- Discuss concept plans and try to achieve a concensus.
- Decide on the final concept plan.
- Develop the final detailed plan and show stages of development.
- Finalise the fund raising.

⇩

**ACTION**

**Fig. 6.4** *Implementing Proposals for the Development of School grounds*

## Selecting Priorities

The working party should consult students, teachers, school administrators, parents, school council, the local community and Education Department personnel to ascertain their feelings, as accurately as possible, and to identify the most popular ideas. Briefings may be held to explain the project and outline the range of ideas so far available. The aim of this is to broaden everyone's horizon. Briefings can be followed by discussion to bring out further ideas and any anticipated problems, and to indicate areas of agreement. New ideas, whether from students or from staff, should be evaluated by the groups involved before being passed back to the working party. Questionnaires (see Figure 33 for an example) may be used to set out the alternatives, heighten awareness of the project, and ultimately begin to sort out the most popular items. Contradictory, or opposing, proposals may be set out and so force opinions to galvanise.

Using a consensus approach, the working party will need to sort out those items given a high priority by the discussion groups, in questionnaires, and in ideas from other sources. A list should be made of these. Less popular items should not be excluded automatically: they may fill important gaps in the overall plan. The working party should by now be in a position to determine the feasibility of selected items over a specified time horizon.

## Costing

Once the working party has identified the major priority items that the school has determined, and that should include more than the number likely to be included in the final plan, they should obtain quotes to cover cost of labour and materials, maintenance, as well as the estimated time for completion from local contractors. Some costs may be offset by using expertise available and volunteered from within the school community.

The results of the overall costing exercise—quotes from contractors, costs of landscaping materials and plants, and so on—will soon make clear those items that are feasible within the school's financial situation. The costing exercise may also indicate the need for a number of development stages over several years if all the desired proposals are to be implemented.

## The Plans

Having thus established the most popular items, the costs involved, the priorities and thus the feasibility, it is now that the concept plans should be drawn by someone with mapping or drawing ability. It is preferable to provide one or two alternative plans. The concept plans should include the main ideas or desired features in sufficient outline for them to be meaningful. Agreement must now be reached between the ultimate users of the schoolgrounds and all groups mentioned earlier should be again consulted, and be seen to be consulted. Eventually, through discussion and compromise, or through voting, a final decision must be arrived at. An outsider on the working party can play a vital role in helping the groups reach a consensus.

Once consensus is achieved, a detailed plan can be drawn and presented for display. The plan should show the main features of development and their stages over a given time. The detailed plan can be produced for stage 1 only, but it is preferable to prepare a plan for the entire grounds. This avoids the likelihood of haphazard development. It is especially important that file copies be kept in case of future staff turnover. Upon completion of the detailed plans, the school is in a position to commence work. Fund raising activities, which were run in conjunction with the earlier work, should be at an advanced stage.

## The Action

A timetable for activities should be drawn up by the Grounds Committee. Parents, local citizens or community groups willing to assist should be contacted. Where they are to be employed, contractors should be notified as to when they will be needed. A basic timetable would show the following:

- Assembling materials/equipment
- Site preparation
- Landscaping
- Planting
- Mulching
- Clean Up
- Maintenance

This timetable should consider the most appropriate working activities in accordance with the most appropriate season. Planting should take place in autumn or spring in most places, thus the preceding activities should have been concluded beforehand.

Students can be involved in all of these stages during regular school days and on weekends in activities such as digging, landscaping, constructing and planting. This not only increases their commitment to the success of the project but may help avoid vandalism later on.

If parents and community groups are to be involved, then working bees will need to be organised. These need to be well organised. People need to be given careful instructions as to their activities for the day. One person should have the responsibility to oversee the project, make on the spot decisions and ensure quality of work. Volunteer workers must accept this person's authority for the construction to proceed smoothly. A phased program should allow the completion of each stage in reasonably quick time. Thus the working bee will see success for its labours and the whole school can begin to see the effects of the project. This may encourage others to become involved. Often working bees can be concluded with a barbeque or picnic and so take on a more relaxed and social atmosphere. Insurance cover will be needed for all 'workers'.

If a contractor is to be employed, then the site should be fully prepared. Often they are employed on an hour, half-day, or day rate. Thus if they can commence immediately, considerable funds can be saved. Working bees can prepare for their arrival or clean up after they have gone.

In all, the action should be timetabled and directed by the Grounds Committee. All work should be in accordance with the detailed plans and the project will gain added stimulus if stages are seen to be completed. A ceremony at the completion of each stage can help.

## CONCLUSION

The involvement of students throughout such a project will not only increase their awareness and knowledge of the local environment but will develop their skills in collecting, organising and presenting data. Decision-making and advocacy skills, as well as skills in effecting policy and practice, will be learned through active participation in the project. Attitudes to the local environment as well as towards social structures will be developed. Such benefits need not of course be confined to the students. In fact, the *process* of providing better schoolground facilities for the intellectual, social and emotional education of children can have significant educational value to the students, teachers and parents who become involved in it.

## FOR FURTHER HELP

Australian Plant Study, *Grow What Where*, (a quick guide to plants with special uses, available from the Group, 1 Balacombe Crt, Croydon, Vic. 3136.)

Children's Environments Advisory Service. *What is an Adventure Playground?*

*Gengtsson, A., The Child's Right to Play*, International Playground Association, 1974.

Dattner, R., *Design for Play*, MIT Press 1974. (Useful background to the philosophy, sociology and psychology of designing playgrounds in urban U.S.A.).

Lady Allen of Hurtwood. *Planning for Play*, Thames and Hudson, 1968.

Lothian, N., *Commensense Gardening*, Pollard, 1976.

Moloney. *Designing Australian Bush Gardens*, Horwitz, 1967.

McKinlay, B., *Growing Things:* Nature Study Ideas for the Primary School, Primary Education Pty Ltd, Vic, 1979.

Bell, G. & Tyrwhitt, J., *Human Identity in the Urban Environment*, Pelican, 1972.

Mules, B., *Keeping Reptiles and Amphibians*, Education Department, S.A., 1975.

Newmann, F. M., *Education of Citizen Action:* Challenge for Secondary Curriculum, McCutchen, 1975.

'POD', *Primer for Playground Planning, POD on Cubbies, POD on Ropes, POD on Tyres, Go Jump*—film on setting up a playground in a park. Available from Playgrounds on Demand (POD), 32 The Boulevard, Floreat, W.A. 6014.

Readers Digest, *Landscape Gardening*. Practical Guide to Home Landscaping, 1976.

Rogers, F., *Growing Australian Native Plants*, Nelson, 1971; *Growing More Australian Native Plants*, Nelson, 1975.

Ross, *et. al., A Study Guide for Native Australian Plants*, McDonald Park Primary School, Mount Gambier, S.A., 1977. (Activities and background information).

Salter, B., *Australian Native Gardens and Birds*, Ure Smith, 1977.

Society for Growing Australian Plants can be helpful in selecting plants for special functions.

Victorian Playground and Recreation Association, 37 Gertrude Street, Fitzroy, Vic. 3056, sells a large range of books and will help with design, materials lists, plans, displays and supervision of construction. Pamphlets on designing a playground, mound making and maintenance considerations for plantings are available from John Mason, c/- above.

Wilson G., *Landscaping with Australian Plants*, Nelson, 1975.

# *THE ENVIRONMENT WEEK FESTIVAL AT PRINCES HILL HIGH SCHOOL, 1978*

*John Stirling*

---

## PREAMBLE

A festival has a positive connotation not often associated with environmental events. It is a highly visible activity guaranteed to go beyond the bounds of the school and into the community at large. Such was the aim of a Victorian school which worked with the local residents' association to run highly successful festivals in 1978 and 1979. The idea for the festival came from some Year 10 students who, through an environmental studies unit, were trying to increase the awareness among their fellow students of changes occurring in their local area. Feeling deflated by the lack of response to displays around the school they decided that a concentrated week of activities might be more rewarding for the energy expended. The organisation and the trials and tribulations of running such an event are outlined in detail.

One-off events such as this are a common approach to topics not included in the normal curriculum. Does this detract from them in the eyes of the students and the community, or is the effect just the opposite? The reader is left to judge.

---

## INTRODUCTION

The aim of this account is to detail the planning and organisation required to hold a week-long environmental festival to link educational and environmental themes for students and the wider community.

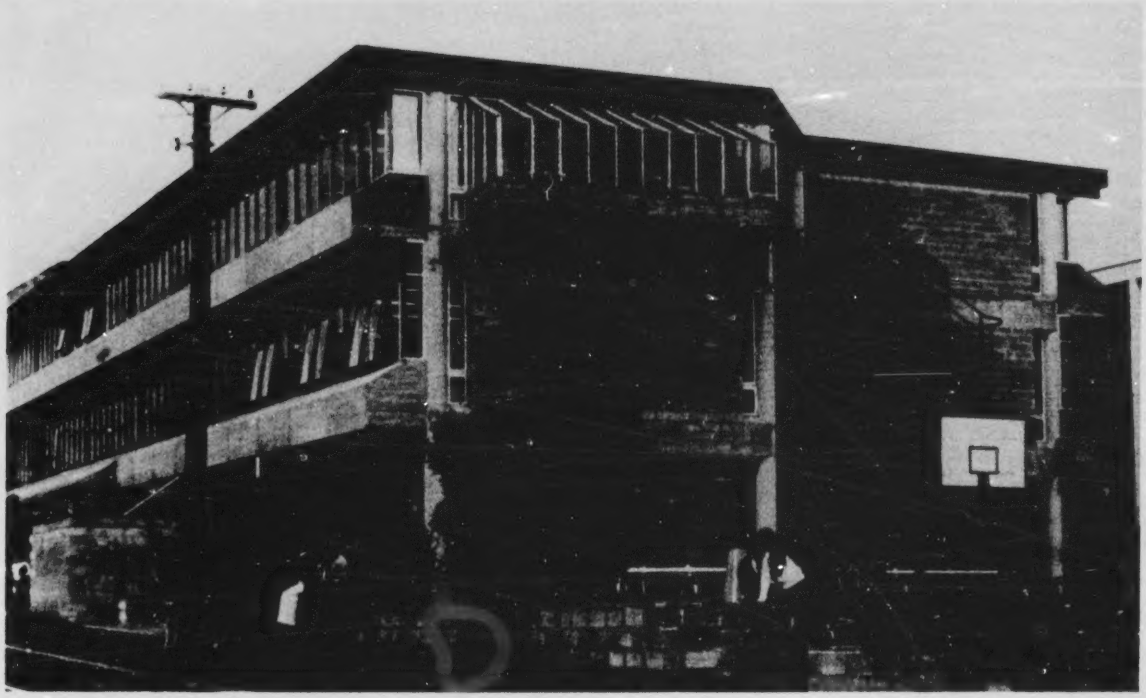
Environment Week was launched at Princes Hill High School during October 1978. Students, teachers, environmentalists, and the local community participated in a variety of activities relating to matters of local and global environmental concern. The purpose of the week was to draw attention to what is happening to the environment and what might be done to improve it.

The various activities which occurred during the week were designed to highlight the need for an awareness of and sensitivity to natural and man-made environments. Emphasis was placed on informal educational activities. A variety of films, guest speakers, excursions, static displays, environmental stalls, and pamphlets were available to teachers and students. The local people, through the long established resident action group (the Carlton Association), organised a public meeting with the theme 'Carlton—An Environment Under Threat' as well as a community day on the Sunday to conclude the week's activities.

For Princes Hill High School, Environment Week was organised to provide a fresh approach which would assist individuals and groups within the school to develop a greater sense of responsibility and urgency regarding environmental problems.

## BEGINNINGS—THE GERM OF AN IDEA

Princes Hill High School is situated in inner suburban Melbourne in a community which is threatened by a variety of features which directly affect human happiness and the quality of life.



*Princes Hill High School.*

One such feature is the intrusion of traffic. This severs the community from shops, schools, and recreational activities. Freeways to accommodate the ever-increasing traffic pose a further threat. During the week commuters cause parking blight. Patrons of the nearby stadium cause blight at the weekend. The expansion of institutions such as Melbourne University and its associated colleges, hospitals and industry, into residential areas is a further problem as are the intensive construction of flats which are destroying the character and charm of an old suburb, and the shifts in population which must occur when property values increase rapidly because of the attractiveness of the area. Finally, there is a general lack of open space for passive and active recreation.

The school is situated on a pocket-handkerchief block of less than a hectare, most of which is occupied by buildings. The front street is taken over by the seven hundred students during lunch and recess. Princes Park, a large reserve situated a block away, provides an attractive area for many students at midday.

Students come from a vast collection of backgrounds. Around forty nationalities are represented. Socio-economic and home environments range from comfortably rich to extremely poor, and from housing authority high-rise flats and simple terrace dwellings to larger, more substantial homes.

The local community has a tradition of being vocal and the Carlton Association, an influential resident action group, has been successful in keeping check on a variety of threats to the area. Through their actions, a number of schemes to enhance the suburb have been introduced.

Over the years the school has contributed consciously towards an improved environment for the students attending the school. A school camp was established in 1970 in a bush setting near Mount Buller. All students have an opportunity to attend. The school building, altered extensively as a result of a destructive fire in 1970, won architectural awards and is carefully maintained. The school is now extensively used after school hours as a community facility.

The author, the co-ordinator of the Art/Craft faculty, has been at the school since 1968 and is responsible for the development of its buildings and grounds. He is also involved with the local community as a councillor, a parent and an active member of the National Trust. Because of his concern for the environment and the apparent lack of awareness of students, concerning ways to preserve and enhance the environment, he introduced a course of study for interested Year 10 students on the theme 'Our World, Our Environment: Who Cares? Do You?'

These Year 10 students soon realised that, while they showed concern for a range of environmental issues relating to the school, the local area, and beyond, many others did not. It seemed important to them that the rest of the students and members of the local community were more actively interested in the environment. But response to initial attempts to inform the rest of the students about environmental matters (mainly through visual displays around the school), was generally poor. Consequently, it seemed better to use their energies in the preparation of a concentrated week of activities where established environmental groups could assist in an Environment Festival.

On 10 May, 1978, the following invitation was sent to various organisations asking them to attend an inaugural meeting to plan 'Environment Week':

> Dear Environmentalist,
>
> During Term 3 (possibly between 2nd and 8th October) we intend to launch 'Environment Week' at this school.
>
> It is hoped that during this week a range of environmental activities will occur in the form of films, displays, workshops, environmental happenings, e.g. tree planting, demonstrations, walking trails, guest speakers, environmental stalls and so on.
>
> Some other thoughts for the week include:
>
> (a) Declaring each day a particular theme day—
> Recycling day
> Conservation day
> Transportation day
> Alternative energy day, 'Sun Day'
>
> (b) Involving the community as far as possible in participating in the Environment Week:
> (i) continuing the week over the weekend and evenings;
> (ii) actively participating in the planning of the week's program.
>
> (c) Pre and post Environment Week Activities—planning, press coverage, etc.
>
> We are concerned that insufficient exposure is given to environmental issues Environment Week may be an important way to impress students and the public about environmental issues.
>
> For the week to be a success it will depend on the enthusiasm of environmental groups to participate in the planning and organisation of Environment Week.
>
> We would be delighted if you could send along a representative to the inaugural meeting of Environment Week to be held in the Princes Hill High School Library on Tuesday, 6th June, at 3.00 p.m.
>
> Please contact me by Monday, 5th June (World Environment Day), if you are able to attend the meeting.
>
> Yours faithfully,
> JOHN S. STIRLING

## PLANNING AND PITFALLS

Choosing the most appropriate week seemed to be an important starting point. Sufficient time beforehand was needed to plan the festival and consideration had to be given to students preparing for end-of-year exams. Many weeks were also earmarked for events such as curriculum planning days, parent-teacher evenings, conferences, school excursions, and camps. A check on local community activities also suggested some weeks to avoid. The Principal supported the proposal and agreed to provide finance in the form of postage, telephone calls, and a working budget of $200. Some secretarial help would also be provided by the office staff.

While attendance at the first planning meeting was low for a variety of reasons, those present were enthusiastic about the prospect of an Environment Week festival. Proposals included:

- The week's activities should involve not only students attending Princes Hill High School, but also the local community and various environmental groups.
- Activities should take place during school hours, evenings, and weekends.
- Each day should emphasise a particular theme: e.g., Animal Day, Recycling Day, Transportation Day, Sun Day, Community Involvement Day, Conservation Day, Anti-pollution Day.
- Activities should take the form of films, excursions, demonstrations, displays, workshops, area improvement schemes, guest speakers, essays, art work, and surveys.
- Staff should be invited and encouraged to incorporate aspects of environmental activities into their curriculum for that week.
- That, in order to effectively plan the festival, the following sub-committees should be set up: Publicity, Exhibitions, Curriculum, Community Education, Resources, Program Organisation.

Another important exercise at this first meeting was to compile a list of possible activities for the week under the following headings: Excursions, Films, Guest Speakers, Surveys, Other Interest Groups, Community Participation, General Ideas. Felt pens and large sheets of white paper with the above headings were provided for this purpose and an extensive and exciting range of ideas resulted.

Two subsequent meetings were attended by only small numbers of people and it became obvious that the committee and sub-committee structure would not work. This approach was therefore discarded.

Meanwhile the librarian had established display boards listing various aspects of the organisation and created a cross-referenced card system of individuals and organisations involved in the proposed festival and the likely activities. This became a valuable planning device.

By the third meeting it was apparent that if the week was to be a success then details had to be finalised quickly: Term II holidays were imminent, and after they had finished, Environment Week was only a month away.

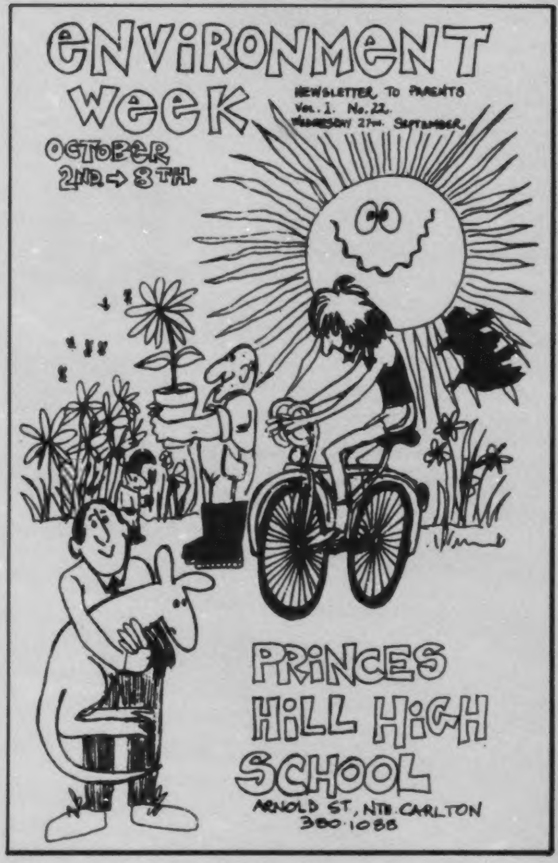
## SELLING THE IDEA

Once it was known what could be provided in the form of films, guest speakers, excursions, and other activities, a large display board was prepared adjacent to the staff room and library for the information of both students and staff. The display included 'The Belgrade Charter' (a framework for environmental education), the times guest speakers would be available, what excursions were planned, the film program and a copy of the current weekly timetable.

A half-hour staff meeting was convened in the week preceding the Term II holidays to explain fully activities organised for Environment Week, and how staff could arrange activities for their classes. It was clear that the week was not intended to replace normal class activities. Once the details were understood the method of selecting activities was explained.

The current weekly timetable became a useful planning device. Once staff selected activities, it was a simple matter to superimpose the booking arrangements onto the current timetable. Within a week or two arrangements had been completed.

The Carlton Association produced a poster announcing the Wednesday evening public meeting and the Community Day planned for the Sunday. Information to parents was conveyed via the weekly newsletter; in this case the painting teacher produced a delightful cover design for the publication. The local newspaper made a brief mention of Environment Week and Community Radio 3CR carried interviews for its 'Habitat and Heritage' program. Information was supplied each day to teachers and students via the Daily Bulletin. Various handouts were made available to teachers so that they could devise their own areas of study around the theme of 'our environment'. One included a list of project ideas developed by the Conservation Council of Victoria.



*Environment Week Newsletter.*

## THE WEEK IN DETAIL

A teacher's aide and library technician were organised as projectionists to show the fifty films booked for the week. A number of displays arrived on the previous Sunday afternoon and were erected around the school to set the festival mood. The Ministry for Conservation supplied displays on National Parks in Victoria, archaeological findings in the State, and two large plastic modular exhibits depicting the habitat of two species of birds. The Town and Country Planning Board provided a display on planning considerations for the Macedon Ranges (an area some 70km from Melbourne constantly under pressure by developers). One of the State Colleges assisted with a display on environmental occupations, a solar energy display with actual working models of boats, radios, cars, and a display on recycling. The art teacher presented a display in the form of a diorama on wildlife in inner suburbia. A commercially manufactured solar hot water collector was set up in the library. Various posters concerning the environment were displayed around the school.

Most students had an opportunity of viewing all of the many excellent films available for the week but an important aspect of planning was to ensure that they did not see the whole or part of the program twice. This did not always happen as some teachers took their class to a film program without first booking. And while the films were significant in their messages, their impact was diminished because of inadequate pre- and post-film activities.

While films became the dominant activity for the week during normal classroom time, the various guest speakers arranged proved to have greater impact. On the Wednesday morning a representative from the Melbourne-based 'Freeway Action Group' spoke to two combined classes on the impact of the motor vehicle and freeway construction. Mrs Pritchard discussed the progress of the construction of the Pritchard steam car and its energy-saving virtues to approximately eighty students on Wednesday afternoon. On Thursday an experienced forester, spoke to a senior class on the changes over the years in the area where the school has its camp. The talk was illustrated with a 1940s film of the area. Three representatives from the Bicycle Institute discussed bicycle safety, security, and present and future planning proposals for cycle tracks around Melbourne. Kevin Heinze, a well known gardener and television personality, captivated approximately two hundred students when he spoke on the care and value of plants. Kevin demonstrated how to pot plants, commented on the reasons why many of the indoor plants around the school were looking poorly, and made some excellent statements on his attitudes towards a better lifestyle.

Lunch times provided an opportunity for students to view the displays around the school but it took a few days before students and teachers became fully involved with the exception of the excellent working model on solar energy which was situated in the library. This particular display was instantly popular. It was supervised by its maker and students were keen to seek information from him on solar power.

Teachers recognised the value of some of the display material and organised assignments for their classes based on the displays. As these could only remain in the school for the week, however, it was often difficult to plan complete assignments.

During Wednesday lunch time students from the environment class organised the various environment stalls in the canteen and many teachers offered their help. An appeal had been made a month previously for second-hand books, clothing, ornaments, household objects, and other items. Plants were obtained from the State Schools' Nursery for sale and a number of environmental groups had publications, car stickers, and buttons for sale. Proceeds were used to assist the funding of the week and the purchase of library books devoted to environmental issues. Profits were around $150.

Some excursions were organised for the

*Students Selling Buttons, Car Stickers and Publications at Lunch Time*

STOP
BICYCLE INSTITUTE of VICTORIA

*Students on the Puzzle Trail in the Rear Lane of the School*

*Observing Details of a Tree or the Puzzle Trail*

week. One class spent an afternoon at the zoo investigating endangered species. Two classes were introduced to an appreciation of aspects of our built heritage through a well established walking trail in South Melbourne. A walking trail in the form of a 'Puzzle Trail' was devised. This highlighted a number of natural and man-made aspects in and around the school. Quite a few forms from various levels used the trail and it proved to be a great success. Students and teachers alike were surprised to find that a wealth of information and interest can be found in the vicinity of the school.

Community-organised activities included a Wednesday morning meeting and a Sunday Community Day. An evening meeting only attracted around forty people, despite the excellent program of speakers. Three speakers discussed various aspects around the theme 'Carlton—An Environment Under Threat: Past, Present, and Future', and illustrated their talks with the aid of slides. The planned bicycle tour of Carlton did not eventuate due to the lack of interest. While the Community Day was not as well attended as hoped, it was a fitting conclusion for the week. The Carlton Association operated several stalls and a number of environmental groups organised displays and the sale of publications. The people who attended seemed to enjoy having lunch at school and discussing matters relating to the environment.

*Community Day Discussions*

## SUMMING UP

Due to the success of the 1978 festival, a second took place in 1979. The experience gained from the previous festival proved beneficial. Funding from the Schools Commission provided a secretary. A previous member of staff who lived in the Carlton area was appointed to this position. She was able to spend a considerable amount of her time contacting organisations, where possible personally, and this proved to be the most worthwhile way of gaining assistance. It was evident however, that many organisations, particularly government departments, were unable to assist as much as they would have liked. While it was possible to have displays delivered in 1978 most had now to be collected. Where previously there seemed little difficulty in organising guest speakers, many had difficulty gaining release from their work. The secretary also had the time to liaise with individual members of the school staff to plan for their specific areas of interest. She was able to advise them on suitable films, speakers and activities.

Secretarial help allowed the organiser to refine and expand the overall festival. A more professional approach was made in presenting information. For example, letterheads and note cards were printed. He was able to speak with key people in the environment movement to elicit their interest and support, and was helped by the Education Officer for the Ministry for Conservation, who conducted an in-service discussion for teachers on environmental education one afternoon and gave generous assistance in organising speakers and displays.

An attempt was made to involve other schools. The Environmental Teachers Association was contacted for a list of schools teaching environmental studies, but none seemed able to participate.

Despite this, awareness of environmental education is being raised in Princes Hill High School with continuation of the festival. It is encouraging to see that teachers who were previously uninvolved are now drawing on the resources provided through Environmental Week. Future festivals should make Princes Hill High School even more committed to environmental education.

## ACKNOWLEDGMENTS

I acknowledge with gratitude the assistance of Robin Youl, Daphne Rogan, Paul Buchanan, Wally Buhaj, Walter Povey, Laurie Wilson and my wife, Ruth Stirling for her constant help and support.

### Organisations Contacted for Environment Week

- Zoo Education Service
- Victorian Environment Centre
- Ministry for Conservation
- Gould League
- Swinburne College of Technology, Science Education Centre
- National Trust of Australia (Vic.)
- Department of Science and the Environment
- Environment Protection Authority
- Emerald Hill Liaison Committee
- Australian Heritage Commission
- Urban Renewal Advisory Committee
- Project Jonah
- Town and Country Planning Board
- The Conservation Council of Victoria
- Patchwork Books*
- Gas and Fuel Corporation
- Citizens Against Freeways
- State Electricity Commission
- Carlton Association
- Environmental Studies Association of Victoria
- Anybody's Cycle Club
- Australian Conservation Foundation
- Inspect
- Alternative Technology Cooperative
- Friends of the Earth
- School Forestry Branch, Education Department
- Environmental Teachers Association
- Koonung-Mullun Forestry Association
- Soil Conservation Authority
- National Parks Service
- Melbourne City Council, Superintendent of Arts
- Elgin Scrap Metals
- Centre for Environmental Studies, Melbourne University
- C.S.I.R.O. Solar Energy Laboratory
- Melbourne State College, Environmental Sciences and Design Departments
- Shire of Mornington
- State Schools' Nursery
- Pritchard Steam Car
- Forestry Commission of Victoria, Environment and Recreation Branch
- Bicycle Institute of Victoria

# SECTION

# 2

## *IMPLEMENTING ENVIRONMENTAL EDUCATION*

# *LANGUAGE DEVELOPMENT AND ENVIRONMENTAL EDUCATION*

*Bernie Higgs*

---

**PREAMBLE**

The author of this article holds strongly to the view that language is used to shape as well as transmit thought and so is the major means by which we make meaning of our environment. In pointing out that conversation is the language form that we use most comfortably as we grope towards new meanings and new understandings, he draws attention to the fact that the language of the classroom is rarely conversational and is the language for adults, not the language of children. The consequence is that an adult conception of the world is transmitted to children. To overcome the barrier to learning that this creates, he proposes the adoption of *exploratory talk* where children are able to develop understandings through discussion and consideration of their own experiences. How exploratory talk can be used for environmental education is illustrated through the case where children are requested to examine a street of old houses threatened by redevelopment. His concluding comments are worthy of stating at the outset for they summarise the position the article takes: 'We are not in the business of imposing our own model of the world but with introducing students to the processes by which they can make their own meaning of it. The journey is therefore more important than the arrival.'

---

## A. IN THE CLASSROOM

### LANGUAGE IN THE SCHOOL

By the time they start formal schooling, children have a well developed language of their own which they use effectively. This language develops further as children progress through the school, in part because the school feels it has a major responsibility for assisting language development, but a gulf eventually develops between the language of the school and the language of the children in it. By the time children enter secondary school, this gulf may have widened to the extent that the language of the school may form a barrier to effective learning.

The reasons for this are not difficult to find. School language is adult language. It is the language of textbooks and is formal, public and impersonal. It can be very much like the following, taken from a text in physical science:

> Water pollution control embraces a wide collection of devices or actions. For instance, mechanical, in-stream aeration provides dissolved oxygen to a stream and may be considered pollution control. The use of biodegradable detergents is a form of pollution control.

This is a far cry from the lively, personal, fluent talk of the playground, yet it is the medium for much of the talking and most of the writing that takes place in the classroom. When concepts like 'pollution control' are presented in a way that their understanding is dependent on an understanding of terms like 'mechanical, in-stream aeration', then it may well be that it is the demands of the language and not the level of thinking required that impedes the children's understanding and conceptualising.

Differences between the language of children and the language of the school or adults derive from an obvious feature of our relationships with the world in which we live. From the outset this relationship is an active one. We do not sit and wait for the world to inflict itself on our senses. Rather, we explore and interpret what goes on around us actively, we try to make sense of this and we work to control it. As a consequence, we make our own meaning of the environment through constructing our 'model' of the world. This model forms the basis of our continued understanding and is our filter for receiving and processing new inputs and for evaluating known concepts. When children or adults meet new situations, they are simultaneously processing the known. Their interpretations of what is happening are influenced by the expectations they bring to the situation. In particular, the words they hear will be processed in terms of their own experiences—the words they speak will express the dimensions of that experience. Obviously the language a child uses will be his or her own. Adult language involves different experiences and expectations and will reflect a different model of the world.

## Conservation and Learning

The most natural, and usual form of language use is conversation. This is the everyday language of adults as well as children and is important to learning about and understanding the world because its essential feature is that it is exploratory talk. Conversation has an obvious social function but it must be stressed that it is the main language form we use to explore the world. This is because it has the following attributes:

- It is the language closest to the speaker.
- It is hesitant, inexplicit and discursive.
- It is marked by false starts, rephrasings, and changes in direction, and hence it enables us to reshape our ideas as we go.
- As it is accepted for its shortcomings, the listener is tolerant of these features.

Conversation is therefore the language we use most comfortably as we grope towards new meanings and understandings.

The value of exploratory talk is recognised almost intuitively by parents. They let their very young talk freely, and delight in encouraging their explorations. They are good at this because the success of exploratory talk is dependent on the presence of a supportive environment within which the talk can take place.

For adults, conversation is at its most sincere when intimates talk or when the conversationalists experience positive feedback and response and when they are given the encouragement to relax and elaborate their views.

Experience of this sort of talk is the resource that all students bring with them to school. This being the case, the active encouragement of exploratory talk would seem to be an essential requirement of effective learning.

## Exploratory Talk in the Classroom

Too often, classroom talk and discussions are dominated by the teacher. And it is not conversation or even real dialogue for it is based on the premise that the teacher's main task is the transmission of knowledge—knowledge that has been conceptualised from an adult point of view. A quick sketch of the classroom where the teacher dominates discussion may go something like this: the teacher talks, pupils listen; teacher asks questions, pupils attempt to guess the answer that they know the teacher already has in mind; teacher proposes an activity, pupils investigate matters the teacher knows all about; the pupils give the resultant information back to the teacher in a talk, project, or essay, attempting to match the teacher's way of expressing things as closely as possible.

What is needed to introduce real and effective learning into the classroom is to allow the full use of exploratory talk. The cornerstone of this is the realisation that language is the major means by which we make meaning of our world. We must realise that language is used not merely to transmit thought but that it also shapes thought. Exploratory talk requires the teacher to create situations where children are encouraged to:

- use their own language to explore, recall, predict, plan, analyse, report, and create
- use exploratory talk to think aloud
- work in an environment where change, modification, supposition, suggestion and challenge can take place, and where tentative and new ideas can be tried out in supportive, encouraging situations.

An excellent medium for achieving these ends is to have children work in small, supportive peer groups.

## ENVIRONMENTAL EDUCATION AND EXPLORATORY TALK

To demonstrate how exploratory talk can be used, let us consider the case where children are required to examine a street of old houses threatened by redevelopment. This example has been used in the film *Talking to Learn* produced by the Western Australian Education Department. The teacher wants the students to explore such aspects as what it is like to live in the street, whether the buildings should be retained, and what the impact of redevelopment on the area might be. Whatever approach is used, a good deal of activity will occur before children explore the area and offer their opinions. For example, reasons for undertaking the study will need to be considered, some preliminary reading may be necessary, procedures for carrying out the fieldwork and recording the results will have to be discussed. Throughout all activities, the teacher will need to take careful account of the language experiences that take place. Great care must be taken to ensure that the proceedings have been conceptualised adequately from the child's point of view which means that a number of organisational traps need to be avoided. The very structure of the program could mean that the teacher imposes an adult viewpoint on the children's learning for, without consulting them, he or she might decide such things as the geographical extent of the project area, the nature of the preparatory reading, the forms the recording and reporting of the results might take, and the student assessment procedures.

From the beginning of the project, children should be given opportunities, preferably in small groups, to engage in exploratory talk about the venture and the problems and issues it involves. Limited though this may be in terms of background awareness and knowledge, it does provide the base from which the needs or purposes of the project, as seen by the children, can be articulated.

This early talk will be loose, ill-informed, unstructured, and probably illogical, but real understanding about what is important in the project, even why it is being undertaken will be given the chance to become firmly linked to the present understandings and awareness of the world experienced by each child.

Each stage of the project as it develops into fieldwork, the evaluation of the research information, comparisons with similar situations, preparation of the material for reporting, and so on, should be based on a foundation of exploratory talk. By discussing the material with peers, explaining what they think is meant by a particular point, and, in turn, listening to explanations offered by others, students will begin to create understandings and feelings of relevance that can never be imposed or created by the teacher.

It cannot be emphasised strongly enough that the introduction of any new area of learning, and particularly if it is concerned with the development of attitudes and the clarification of values, should be accompanied by, and founded upon, the child's own language. Unless children can use their everyday language to deal with and come to terms with knowledge, ideas, experiences and values, and to relate these to their accumulated experiences and understandings of life, they will be deprived of an essential means of educating themselves.

### Anticipating Problems

However much we accept the centrality of the children's language to their learning, we are likely to have reservations about the degree to which it applies. Two worries are particularly common:

- The concern that student talk will inevitably become locked into the limitations of the children's language.
- The fear that the children's work might direct them towards an unrealistic attitude and a distorted view of the topic they are investigating.

The first of these worries can be countered in two ways. Firstly, it must be recognised that language use varies with function. We use different language in different situations according to the demands made upon us. Children are well aware of this and in fact practise it all the time for they speak to their peers very differently from the ways they speak to adults. All children soon learn to obey the varied social conventions of conversation. When school talk is dominated by adult language, the function is almost always related to the teacher's dominant role and most talk is directed towards the teacher. Children are given very little opportunity to develop a range of language use which will equip them to adequately communicate their views to a real audience.

When the time comes in the project for the students to act upon their research, to interpret their findings, to evaluate their responses, and to report and exchange their attitudes, the teacher's task should be to create real situations where the reporting and the debating and exchanging of opinions might take place. For example, the students investigating the proposed street redevelopment should be encouraged to make their report to the local council. Not only does this give the project an air of relevance, but it will demonstrate most effectively the power of language at work, even if this arises from the frustration students feel because they cannot express their views adequately.

Secondly, encouraging exploratory talk does not prohibit the teacher taking a positive role in the development of language skills. Quite the reverse is true for there are ample opportunities for the teacher to enhance the development of language in indirect ways by being patient, by observing, by listening as talk progresses, and by encouraging a supportive climate in the classroom. There will be ways of prompting and reminding, of suggesting that there are alternative ways of expressing things ('historical' rather than 'olden time'), without accusing children that their wording is wrong. And there will be times when the teacher is involved directly. This applies particularly to the introduction of new or unfamiliar terminology. Subject specific language is necessary of course because of its exactness in the expression of abstract concepts or as a shorthand form of a whole list of ideas. However, the concept must be understood before the term is introduced and applied. The word 'redevelopment', for example, will mean little until students have experienced its meaning through observation and discussion. It follows that the development of language skills will be most effective where learning has a real purpose and when there is a real sense of audience.

The concern that children will develop distorted views through exploratory talk has already been part countered by what has been said about real intentions and real purposes. If the intention is to have children really evaluate the situation, then the needs must come from them—they must determine what they need to know in order to make a decision. Having arrived at some judgments, who will be interested in hearing them? If there is a sense of real purpose, then students will be challenged to be realistic. Besides, the assumption that all children think alike and will therefore arrive at the same judgmental positions is clearly false. There are many influences at work on their models of reality and exploratory talk with peers will expose these differences. This is why exploratory talk is so essential for the clarification of values.

In normal conversation, in addition to the string of narratives that make up so much of our daily talk, we try out our beliefs, ideas and values directly and for response. Some conversations are such that the socialising element is dominant and we are reluctant to expose our ideas. In other situations, especially where a purpose and focus exist, we are prepared to challenge others and to have our views challenged in return. This challenge and response requires a supportive environment which can only come about when there is a common task. The task is the essential ingredient that gives exploratory talk the beginnings of purposeful talk which, in turn, is the beginnings of clarifying the issues. The worry that children will cling to only one view denies the ways in which we interact and assumes that there is only one correct model of the world.

Finally, and most importantly, we do not expect children to arrive at any one destination in any one project. As environmental educators, we are concerned to help children make their own meanings of the world so that they can live more fully within it. We are not in the business of imposing our own model of the world but with introducing students to the processes by which they can make their own meaning of it. The journey is therefore more important than the arrival.

# HUMANITY AND THE ENVIRONMENT — AN INTEGRATED APPROACH

*Sylvia Walton*

---

## PREAMBLE

Programs in environmental education can take many forms. In this article, Sylvia Walton describes in detail the Humanity and Environment course developed at Eltham College in suburban Melbourne which has been part of the compulsory core of studies undertaken by students in years 8 to 10 since 1977. The curriculum draws on the disciplines of history, geography and social science on the assumption that each of these specialist areas mutually support each other and give rise to effective integration. Clear links have also been established with the English curriculum. While the curriculum is particularly suited to the needs of Eltham College, it has wider application because of its underlying rationale and because the author has defined 'environment' broadly to mean the total background, material or man made, time past, time present and time future, against which people live out their lives.

---

## INTRODUCTION

Visitors to Eltham College can usually be relied upon to remark on the colour-coded garbage tins:

GREEN for paper
YELLOW for food
RED for plastics, bottles, etc.

This simple example indicates one important aspect of the College philosophy: awareness of various environmental factors including the use and recycling of waste, and involvement in a different aspect of our living. In a sense it is education for the environment.

The suburb of Eltham itself has long attempted to treat its environment in a thinking way. Mud brick houses, often built by the owners, are fairly numerous and are usually suited to the natural features of their sites. Gardens reflect the Australian bush. Change in the 1970s has been rapid in the suburb and conflicts about the environment have resulted.

It is against this background of a fairly clear College philosophy and suburban involvement in environmental issues that the Humanities Program at the secondary level has been set. The two key content issues that have concerned us have been humanity and environment. By humanity, we mean people in the sense of living, moving, working, inter-relating and adapting. By environment, we mean the total background, whether natural or man made, time past, time present or time future, against which people live out their lives.

For Years 8, 9, and 10, Humanity and the Environment is part of their compulsory core studies. All teachers are involved in the program to varying degrees and all students are exposed to it for four periods of 55 minutes each week. Actual interaction varies. The English department, for example, bases much of its content on the Humanities topics. Other school departments work with us at different times throughout the year: Religious studies at each level; Art, especially in Years 8 and 10; Science in Year 9; Home Economics in the multicultural work in Year 10; Mathematics and Graphics co-operate on the map work that is done at each level. The extensive excursion program always involves the whole staff in some way, and it is deliberate school policy to link topics across departments and to mutually support each other as much as possible. Much of this has been established on a personal basis over the past three years. We are fortunate in being a fairly stable staff.

Both the principal and the chairman of the School Council have investigated the possibility of establishing a conservation station on the school property. Land has been set aside and plans drawn up. While this is a total school based program, it is clear that the Humanities Department will be involved. Also, student interest in such a project has some link with our work and efforts.

Parents' involvement is encouraged at the college. Whenever we have needed assistance it has usually been forthcoming. Our program is available to parents, and at times has been outlined at parent evenings. There has been little direct comment, but we assume parents are interested and there is often evidence that they have worked with their sons and daughters.

## THE INTEGRATED APPROACH

The present Humanities curriculum was designed at the end of 1976. It has been in operation since 1977, but each year has seen some revision and refinement of the content, methods and implementation of ideas and skills. The original charter, to provide an integrated course of study from Year 8 to Year 10 suitable to Eltham College and the wide community, has remained the same. The curriculum draws on disciplines of history, geography and social science and there are clear links at every level with the English curriculum.

The integration of the program has followed specific lines. As far as possible the content of history, geography and social science have been integrated and clear unity sought. Where necessary, skills and concepts are taught separately: for example, documentation for history, mapping for geography, handling the different opinions presented by the media for social science. It is important to acknowledge that specialist and separate areas of study do exist, but they can often be folded into each other. Each interest area should inform the other and, if it becomes part of an integrated scheme, it must retain a valid presence sustained by specialist knowledge and adequate resources. It is this idea of specialist areas mutually supporting each other that we have found the most effective form of integration.

When drawing up the curriculum, effective teacher input was considered, as well as the educational needs of the students, the school philosophy, and general nature of the community. Our major problem was one of what to select from the wealth of material and ideas presented. We were also very conscious of theme and idea, sequential skill and concept development, relevance to particular age groups and interests, as well as making provision for the catering for individual development of topics and areas of study of particular personal or small-group interest.

## HUMANITIES CURRICULUM GUIDELINES FOR YEARS 8, 9 AND 10

Within this curriculum our aim has been to create a total environmental awareness, so the curriculum has been designed to assist students to:

- achieve an understanding of the environment in which they live and of which they are part;
- learn definite concepts and skills that are pertinent to the separate subject disciplines;
- perceive unity of theme and assess the contribution made by separate study areas;
- move from local to global concepts and concerns;
- develop powers of observation (Year 8); visual perception and an ability to identify patterns (Years 9 and 10); and an ability to look beyond the patterns to the causes and possible results (Years 10, 11 and 12).

In our view, environmental education should help students fit more comfortably into a particular set of natural and human circumstances. Gaining knowledge and skills about the environment, and also in the environment, are important. However, if it is possible to educate for the environment, the following features are essential in a curriculum:

- understanding environmental features;
- creating an atmosphere of environmental awareness;
- encouraging the development of attitudes and value stances as a result of examining environmental issues.

## THE COURSE

### General

### Rationale

The course was designed on the assumption that teachers needed to understand the definitions, methods, specific aims, skills, concepts and objects of the subjects concerned. It was also assumed that students would be concerned about and interested in their total environment.

## Definitions

For the purpose of course development *history* was defined as that body of knowledge and understanding concerned with man's past actions and relationships. History was also considered to be a special and distinct form of thought which has to be experienced to be appreciated, and a distinct kind of enquiry in which we aim to find out about the actions of human beings that have occurred in the past. History thus proceeds with the discovery, understanding and interpretation of evidence about the human environment.

*Geography* was considered as being a special way of looking at man's relationship with his environment, particularly the areal or spatial patterns evident on the earth's surface. It is therefore concerned with the description, analysis and explanation of the location of phenomena on the surface of the earth.

*Social science* was defined as the general body of knowledge concerned with how people live and therefore with social change and culture in general.

The following topics are consistent with the structure of these three disciplines and should be incorporated into general humanities themes, especially when specific interest arises:

(i) *Population:* its continued growth; how to provide for people; how to limit numbers. This is a basic area of study and can be considered from a scientific and/or value point of view.

(ii) *Society:* how people live is an important study that is full of present and potential conflict, compromise and understanding. The differences between ideologies, racial and power groups as well as awareness of different cultures and the need for tolerance and respect for other viewpoints and ways of life are essential elements.

(iii) *Loyalties and allegiance:* throughout the world these are in a state of flux. Consideration of attitudes towards Australia's relations to the Commonwealth, Europe, U.S.A., Asia, and other areas, as well as economic commitments by both individuals and nations is necessary. The concepts of personal and national pride and the conflicts faced by migrants in new lands is also an important part of this study.

(iv) *Technology, industrialisation, automation, urbanisation:* this involves the concept of development in rural and urban areas, rates and degree of development of energy supplies, conservation and pollution, human creativity, planning and related areas.

(v) *Human relationships:* developments in group dynamics and experience with leadership in work (industry) and administration (government). As new demands are being placed on youth to participate in all areas of living, it is necessary for students to learn to cope. Opportunities need to be given for the student to share in decision-making, planning, and execution of various tasks.

(vi) *Ethics:* values by which we do, or ought to live.

(vii) An *analysis of current social phenomena* as presented in the media.

(viii) *Environmental concerns:* these are of a total nature and involve the physical and human worlds. There is a concern with the environment for the future of the total world, and for the concept of educating for this total environment.

## Methods

Methods used in the classroom are the prerogative of individual teachers but the following provide guidelines for possible teaching strategies.

(i) Selection of the main emphasis of a topic, for example, in a course emphasising citizenship and social values, may result in a functional or problem-solving curriculum which draws largely on current social issues and which stress the logical development of an argument.

(ii) To ensure unity and content sequence it is essential that there is a co-operative advance on all subject fronts. When methods are being considered the following questions need to be asked:
  (a) does the content reflect current knowledge?
  (b) does the content have universal significance that will help the students to use the information in other situations?
  (c) have the relevant skills of the separate disciplines been taught in a proper sequence so as to promote cohesion and student understanding?

(iii) Methods should use approaches that will, as far as possible, promote academic progress as well as student interest and involvement. For example:

- guided individual work on an interest or ability basis;
- the use of enquiry models;
- methods that help essential problem-solving;
- team teaching;
- plays, games, special situations and other activities;
- multi-media approach.

## COURSE OUTLINE
## YEAR 8

**Overall theme:** Emerging societies and their environmental development.

**Social science emphasis:** Cultural differences, and contributions of emerging societies.

### HISTORY: Aims, Concepts, Skills

*Aims.* These are to introduce students to historical thinking processes and to encourage them to enjoy gaining knowledge about the past and attempting to use this knowledge for its own sake. During class time, personal development and a concerned social outlook should be encouraged, as well as an awareness for the effect the environment has on mankind.

*Concepts.* The key concepts to be stressed at this time are 'the past' and 'historical time'.

*Skills.* Those to be developed should include:

- literary comprehension and selection of material that is relevant to the topic;
- visual comprehension of illustrations and other data;
- writing and presentation including note-taking;
- group and individual activity and experience;
- role plays and simulation exercises.

### GEOGRAPHY: Aims, Concepts, Skills

*Aims* include the establishment of clear ideas about the geographic method, increasing students' awareness of the importance of the resource that influences the life and behaviour of people, the creation of some understanding of, and tolerance towards, other cultures and people, and the encouragement of the necessary skills of research and expression which are important for the efficient acquisition, recording and presentation of geographical knowledge.

*Concepts* include the basics of spatial arrangement and interaction as well as some idea of cycles, patterns and processes. At the Year 8 level, emphasis should be on understanding relationships between the human and physical elements of the areas studied, and their associated environments.

*Skills.* Included in this are map reading and map making (direction, scale, legends and keys, visualisation of relief, analysis and using maps in classroom and field), use of an atlas as a tool and resource, numerical and literary comprehension for analysis and comparison, and behaviour and responsibility in the classroom, the library and the field.

**HISTORY** **GEOGRAPHY**

---

### Term 1

*General Introduction.* An outline of the earth's resource base that assisted civilisations to develop and evolve in the various study areas.

1. *Greek civilisation and culture*

This should include an outline of the main historical events and the importance of Greek life and culture on the subsequent history of the 'West'.

- Crete, Mycene
- Athens, Sparta, Corinth, Macedon
- Fifth Century Athens to the death of Alexander the Great
- the decline of the Greeks

1. *Hospitable environments*

*(a) The area surrounding the Mediterranean sea.* *'Mediterranean'* (Koppen's Cs) of the old and new world, especially in relation to the history component. A consideration of location, climate, biogeography, landforms, agriculture, manufacturing, population, settlement. A special study of migration in the 20th century to Australia from Mediterranean lands might be included as a major component.

## HISTORY

*2. Rome — Its rise and fall*

The links between Greece and Rome. How Rome began. Roman life and cultural development.

- the grandeur of Rome
- the disintegration of Rome
- the enduring contribution of Rome to the 'West'

**Term 2**

1. *The Europeans:* The Germanic Tribes, the 'Barbarians' and the Nordic 'Vikings': the state of these groups once Rome ceased to be a dominant power; their life, government and culture.

2. *Byzantium:* From the fall of Rome (Diacletian Empire) to the 12th century Turkish takeover:

- the links between Byzantium and Rome
- why Byzantium lasted and Rome disintegrated
- main rulers and cultural developments
- reasons for decline
- contribution to other civilisations

**Term 3**

1. *The Arabs:* The links between Byzantium and this group.

- Arab groups and their cultural and political development
- religion and its importance
- rise to power and contribution to subsequent civilisations

2. *The Indus:* The early developments on the Indian subcontinent.

- Mahenjo-Daro and Harrapa
- government, cultural and religious development
- enduring contributions to India

3. *The Chinese:* The earliest developments in China — culminating the the Tang dynasty.

- the culture, government and organisational development of the early Chinese
- enduring contribution to Chinese civilisation

## GEOGRAPHY

(b) Contrasts in living between old world and new world areas.

(c) The value of irrigation throughout history in these areas.

*2. Difficult environments*

(a) *Mountains* — especially in relation to the areas inhabited by the Barbarian tribes and the Vikings.

Different types of mountain formation and erosion, including glaciation. Vegetation, soils, climate. How people live today in these environments.

(b) *Deserts* — especially in relation to Byzantium:

- location, types, climates
- vegetation and soils
- land-forms
- lifestyles and settlements
- economic activities
- how Australia manages its desert environment
- the different lifestyles that exist

*3. Maps*

The atlas, form line maps, drawing maps, introduction to topographic maps. (Specific map skills are listed separately. However, the concept of spatial arrangements needs to be continually stressed.)

*4. River Valleys*

Their importance in the emergence of civilisations. A brief, descriptive study of some of the great river valleys —

- Nile
- Indus
- Yellow
- the inter-relationship between the physical and cultural environments.
- the need to utilise and conserve our river resources

*Conclusion to Year 8 Course:* From Greece and Rome to the beginnings of the 18th century, world societies emerged in a variety of ways but there are recurrent themes. For example, it was necessary for different groups of people to come to terms with difficult environments, and this gave rise to diverse forms of human expression. Agriculture and irrigation were basic to many of these societies. The cultures that emerged contributed a variety of lifestyles and knowledge to the ongoing process of development and there was a constant process of influencing and spreading from one area to another. The general themes of social emergence, cultural development and environmental awareness should be understood by the students.

*Excursions:* During Year 8, two major excursions are undertaken. The first involves a one-day trip from Eltham to the city. The purpose is to show the students different cultural, religious and environmental patterns. A mosque, a synagogue, orthodox churches (Greek and Byzantium) and a Catholic Cathedral are visited. The second excursion occurs towards the end of Term III and involves a three-day trip to the western district of Victoria. The purpose of this excursion is to study the physical environment first hand and also to evaluate changes in human occupancy of this environment. Some of the main features include:

- a student-kept trip map showing main physical, land use and occupancy features;
- exposure to a variety of landscape types, e.g. a farming area, a historic town, coastal landscapes.

*Evaluation:* Over the last two years we have found the need to give relevance and life to this course of study. Overall, the excursions provide the most important drawing together in this regard. Year 8 students are willing learners and enjoy the kaleidoscope of content the course offers.

## YEAR 9

**Overall theme:** Modern societies and local studies.

*Social science emphasis:* Australia is the area of study for this year. Cultural issues examined include class, race, social mobility, elitist groups and interest/power conflicts. Use and abuse of the physical and human environment is also emphasised. Where applicable, comparative studies are introduced.

### HISTORY: Aims, concepts, skills

*Aims.* These include examination of the wide variety of man's capacities, mankind's intellectual and practical achievements, cultural developments, and local area studies.

*Concepts.* These include an ability to think in time spans and to see how development takes place. Oral activity, especially discussion, is important.

*Skills.* The following are important:

- document interpretation;
- initial argumentative essay writing;
- literary comprehension and overall presentation.

### GEOGRAPHY: Aims, concepts, skills

*Aims.* To increase interest in, and enjoyment of, using the geographic method when enquiring into the interrelationships between man and his environment through specific examples, especially those involving the local area; and to continue to encourage original thought and student involvement.

*Concepts and Skills.* These are a continuation and extension of those listed for Year 8 with the emphasis on the interrelationships between physical and cultural environments.

### CONTENT

| HISTORY | GEOGRAPHY |
|---|---|

**General Introduction.** The overall theme is the establishment of modern society. The fact that an economic revolution occurred from 1760 to 1850 in Britain needs to be briefly mentioned. The three major phases of this revolution — agricultural, commercial and industrial — are important in the transition from pre-industrial to industrial society. The industrial phase, which saw the application of machinery to production, marked a cornerstone in man's social development. The development of a modern society in Australia from early European discovery and settlement to the present can then be seen against this background.

| HISTORY | GEOGRAPHY |
|---|---|
| **Term 1**<br>*World Background*<br>1. *Beginnings.* From initial discovery to the end of the Macquarie era.<br>• explorers to Cook<br>• British reasons for settlement<br>• how explorers and settlers saw the country<br>• conditions for settlement<br>• progress of settlement through the early governors<br>• economic growth<br>• exploration and expansion<br>• personalities of interest and importance<br>• conflicts between people, groups, areas<br>• British relations with the Australian colonies. | 1. *Physical background*<br>• Landform and basic geology: introduce the idea of continental drift<br>• geological age of continent<br>• main topographic features and outline of present day geomorphology<br>• climate: continental patterns and the reasons for this<br>• weather<br>• soil and vegetation in relation to landform and basic geology and climate<br>• rivers: location and importance in relation to early history, what advantages and disadvantages did the areas of settlement offer to those in Australia and Britain. |
| **Term 2**<br>2. *Nineteenth century growth*<br>Establishment of British settlements in various areas; other European settlements.<br>Governors from Macquarie to the establishment of Representative Councils around 1851.<br>*WOOL.* Pastoralists and squatters. Continued expansion in country and city. Conflict between power groups.<br>*GOLD.* In detail, especially its impact on developing society. Technical and industrial development from the 1860s.<br>*CITIES.* Their growth in the latter half of the 19th century: class division; social mobility.<br>*MIGRATION.* Development and role of trade unions in Australia; how people lived; political growth; attitudes towards Britain.<br>*1901 FEDERATION.* How this was achieved; important personalities. | 2. *Water in Australia*<br>Its location: climate and rivers; its use and its importance.<br>3. *Agricultural geography*<br>Physical requirements of the different agricultural products that were developed and introduced to Australia in the 19th century; supply and demand at home and overseas.<br>Detail of the wool, cattle and wheat industries.<br>Irrigation growth: continued development; social and economic importance.<br>Artesian water and its value to the pastoral economy.<br>4. *Manufacturing geography*<br>Initial power sources: iron reserves; the steel industry — its location and development; development of industrial and manufacturing regions; supply and demand; the problems of establishing industry in Australia; social implications of industry. Compare and contrast the developing of manufacturing in Britain and the United States with Australia during the same period. |
| **Term 3**<br>3. *Twentieth century Australia and the world*<br>*From 1901-1914:* continued growth of nationalistic feeling; social and political developments; White Australia; leading personalities. | 5. *Resource and trade geography*<br>*Resources:* agricultural; extractor (sea, forest minerals); manufacturing; how these have developed and changed from 1914 to 1945 and from 1945 to date. |

*World War I:* comparison and contrast between Australia, U.S.A. and Britain; attitudes, reasons, consequences; A.N.Z.A.C. and developing traditions.

*1920s:* compare and contrast with U.S.A.

*1930s:* depression and the aftermath; causes and consequences.

*World War II:* Australia's involvement; political, economic and social implications.

*Migration:* Who? Why? social and political consequences.

*1945 to date:* external relations with United Nations, Korea, Malaya, Indonesia, Vietnam; internal growth and change in policies, social patterns and the economy.

*1949-1972:* 'Liberal era'; changes since 1972: personalities.

*Trade:* the trade groups within which Australia operates — Commonwealth, Common Market, Asian developments, U.S.A.; emphasis on change, especially since 1945; the concepts of tariffs and protection.

6. *Settlement geography*

The differences between rural and urban settlements; reasons for Australia's particular pattern; characteristics; concept, reasons for and problems of decentralisation; comparison and contrast with the U.S.A. are made.

The role of planning in Australia.

---

*Conclusion to Year 9 Course:* By the 1960s Australia was a developed, sophisticated society with a solid economic base. The experiences of the gold rushes, Federation, two world wars, a major economic depression, as well as changing links with the rest of the world, all contributed to the growth of this particular modern society. The point needs to be made that other nations have other stories and potentials but many of the generalisations are the same.

With regard to methods, the following points can be considered:

- the geography component follows systematic themes that are interwoven with the history;
- the history component for Terms 2 and 3 could be taught in a time continuum or as themes — this is for the individual teacher to decide;
- the social science component flows through the whole year's work and should be emphasised when necessary. Some special study areas are clearly indicated:
  - class groups and conflicts
  - social mobility and the role of wealth
  - migration and the cultural problems that occur
  - relationships between people and different groups in society and between Australia and other countries, especially establishing identity with the Asian world
  - the various conflicts between different groups, and their environmental perception that can be seen in the local area and sometimes the students and their families are actively involved.

*Local Studies and Excursions:* Each student in Year 9 is required to undertake a personal piece of research within the local environment. Topics are varied and include investigation into proposed subdivisions, tracing the history of buildings and properties, as well as small impact studies involving causes and effect from changing land use. The skills and concepts of both history and geography are important in this work. Local studies are vital to the program in that the students begin to actively assess the real world.

The Year 9 excursion program is based on the local studies topics. Provision is made for the equivalent of three days to be spent in field and first hand investigations. There is also a full day trip to a site where early development took place. In our case, this is the Sorrento district which provides valuable contrasts with the area surrounding Eltham. The physical environment that the early settlers encountered is an important consideration. Finally, there is one half day visit to a dam development site (Sugarloaf), which has been an issue of some importance in the area around Eltham, but considered necessary for the total water needs of Greater Melbourne.

*Evaluation:* As yet it is early days for this program, and the local history component is being trialled fully for the first time. There will be a need to fully evaluate the total year's work once the whole scheme has been completed.

## YEAR 10

*Overall theme:* Social growth and development

*Social science emphasis:* Cultural conflict including a consideration of war, revolution, ideological clashes and the relative nature of poverty. The concepts of development, underdevelopment and optimum growth are considered. Selected Asian and African areas will be studied and where applicable, reference to contemporary Australia will be made.

### HISTORY: Aims, concepts, skills

*Aims.* These include challenging the thinking, questioning and analytical ability of the student; and a stress on the development of tolerance towards the ideas and cultures of other nations.

*Concepts.* These should include understanding the reasons for value judgements. There is also a need to continue the development of the Year 9 concepts.

*Skills.* As well as developing those skills listed for Years 8 and 9, stress should be laid on a wide range of reading, the use of documents, comprehensive essay writing, and the critical use and approach to audio-visual and mass media material.

### GEOGRAPHY: Aims, concepts, skills

*Aims.* As well as those aims stated for Years 8 and 9 these include increasing student awareness of the significance of the environment from an ecological and a cultural point of view; the creation of an understanding of other people and their culture; the creation of an understanding of the socio-economic attitudes and aims of the Australian people in comparison with the study areas.

*Concepts.* These are an extension of those listed for Years 8 and 9 with emphasis on environment, spatial interaction, spatial arrangement, scale process and time, cyclic behaviour, and development.

*Skills.* These are an extension of those skills listed for Years 8 and 9 and emphasising map reading and making, literary comprehension, visual comprehension, fieldwork and individual research, and statistics and graphs to show trends.

## CONTENT

**HISTORY** **GEOGRAPHY**

---

*General Introduction:* During the twentieth century, social growth has occurred in a variety of ways in Asia and Africa. This has been particularly pronounced after 1945. India, Indonesia, successive African states and New Guinea, planned, worked, and in many cases, fought for their independence. China began to rebuild after the revolution of 1949, and Japan established her position in the world after defeat. Our concerns are the nature, methods and reasons for the changes that took place and which have led to different forms of social growth.

Social conflict and the role of civil war, revolution and different ideologies should constantly be emphasised in a factual and comparative way. These are current as well as historic problems. The relative nature of poverty is also a concept that needs constant consideration throughout the year. Environmental awareness on a larger scale than previously considered, is an important component of each study area.

### Term 1

1. *India:* Outline of British involvement and the society in India around 1900; nationalist movements and leading personalities; relations between Hindu and Muslim; Ghandi; Nehru; other personalities; 1945-1947; India and Pakistan; development and planning since 1947; India today.

*OR*

2. *Indonesia:* Society under colonial rule: freedom and independence movements; 'Unity in diversity' — Japan, World War II; nature of the nationalist fight; Sukarno and his rule; post Sukarno.

*Comparative resource geography*

In association with the countries being considered the following aspects should be dealt with:

1. *Physical resources:* Land and minerals; climate and water; vegetation, soils, crops and forestry; oceans, rivers and marine life.
2. *Human resources:* Population numbers and pressure; population demands; population skills and traditions; population adaptability to change and develop.
3. *Planning and use of physical and human resources:* Capitalism versus communism; role of government.

**Term 2**

3. *China:* Decline of the Imperial Manchus; European influence and contact; conflict within China — Mao and Jiang; power struggle; Japanese intervention; communism and the 1949 revolution; China under Mao; after Mao.

*OR*

4. *Japan:* 1868 Meiji restoration; westernisation and modernisation; nationalism; co-prosperity sphere and expansion; World War II preparation, participation and outcome; 1945 and defeat; United Nations and Japan; United States and Japan; Japan in the 1960s and 1970s.

5. *New Guinea:* Nature of colonialism and society in the early 20th century; relations with Australia; the United Nations; gradual 'opening-up'; traditional versus western economy; conditions of society around 1945; moves towards independence and its gradual achievement.

*OR*

6. *'Black Africa'* i.e. Africa, south of the Sahara: Complex nature of European colonialism; using selected states (Kenya and Nigeria; Rhodesia and Angola) outline the moves towards full independence; current problems.

4. *Development* of resources by different groups for different purposes. Should all resources be developed? Consideration of resource use in pre- and post-revolutionary China; Japanese use of limited physical resources and a skilled and adaptable population; role of world technology and trade in these countries.

5. *Economic growth:* A comparison of the overall aims of the study areas.

6. *Australian involvement* through trade, aid and foreign policy towards selected countries.

NOTE: The geography component can be done for all the countries over the whole year of the 6 *separate topics related to each country as it is considered.* Topics 1, 2 and 3 require the most emphasis.

7. *Multi cultural studies* Throughout the year a program involving excursions and guest speakers operates to create an awareness of the different ethnic components that make up Melbourne's population.

---

*Conclusion:* A large majority of the world's less privileged people are in the areas studied this year. These people are caught up in a whirl of constant change and growth in many directions. Different concepts of development are needed in order to understand these changes.

During Years 8 to 10 the students should have gained some insight into how and why societies develop, function and change as they do. They should also have a sound factual background related to the various disciplines that make up the humanities course. Throughout the three years the concepts and skills or the different disciplines should also have been introduced and developed and, to a certain extent, mastered by the end of Year 10.

*Excursions and the multi cultural component:* During third term, two full days are spent outside the school in a variety of places that can contribute to student understanding of ethnic contributions and involvement in Melbourne. The students are in small groups of 4-5. Prior to these days outside the school, speakers and groups of visitors enter into the general classroom routine. For example, the staff of the La Trobe University Language Centre spent two afternoons with the Year 10 students; Year 6 from an inner city primary school spend a day at the College with Year 10. The human environment and awareness of its complexity is a major frame of reference.

*Evaluation:* Some students respond throughout the year to this program. They are involved from the beginning and their growth as people is visible. Some, on the other hand, are more tentative about the ideas, concepts and ethnic involvement that they are engaged in. It takes time for this latter group to see the year as a whole.

The majority of students find the year very different from Years 8 and 9. The emphasis on the twentieth century and the social environments that exist, captures their imaginations and they quickly become self-motivating. It is necessary, however, to work with the students as individuals and to discuss ideas, links between the physical and human environments, ethnic similarities and differences and so on.

We have found a sequential approach important in specific skill and concept development. A wide breadth of knowledge is offered to the students in the belief that the middle school years need to interest and stimulate thoughts and attitudes. We feel that a start has been made in generating an awareness of the whole environment.

# *ENVIRONMENTAL EDUCATION AND THE HOME ECONOMICS TEACHER*

*Noel P. Gough*

## PREAMBLE

In this article, Noel Gough makes a reasoned case for the involvement of home economics teachers in a variety of areas of environmental education before outlining a number of activities designed to increase the environmental awareness and understandings of home economics students. He takes as his starting point the position that a major aim of home economics is to effect an optimum balance between people and their environments.

## TOWARDS AN IDEAL: HOME ECONOMICS AND ENVIRONMENTAL RESPONSIBILITY

### Exploring Common Ground

From its beginnings as a profession, home economics has been concerned with the management of resources by individuals and families to achieve the quality of life they desire. Traditionally, the resources that have received the most attention from home economics teachers have been money, time, and human energy. Less attention has been given to such natural resources as each individual's and each family's share in the world's fuels, metals, water, land, and so on.

Similarly, in teaching about home management, a common strategy among home economics teachers has been to focus on the consequences of alternative decisions. Again, the consequences that have received most attention have been related to money, time, and human energy. Nutritional and aesthetic consequences have also been considered, but rarely environmental consequences. To take a somewhat homely example, pupils may have been taught to consider the nutritional and aesthetic consequences of preparing and serving potatoes in various ways, but have rarely been encouraged to consider the environmental consequences of alternative ways of disposing of the peelings.

One recognised aim of home economics is to effect an optimum balance between people and their environments, but it has only recently been realised that this does not just mean providing people with a satisfying environment, but that it also means developing an harmonious relationship to the rest of the living world and to the resources of the earth. It can therefore be argued that home economics education in schools should be directed, in part, to helping pupils to make consumption decisions that will be in harmony with their environment.

Recent definitions of home economics suggest that it is a field of study which ought to have much in common with environmental education. For example:

> The core of home economics is the family ecosystem. It is the study of the reciprocal relations of family to its natural and man-made environments, the effect of these singly or in unison as they shape the internal functioning of families, and the interplays between the family and other social institutions and the physical environment (Bivens, *et al.*, 1975, p. 26).

This statement is similar in many respects to several authoritative definitions of environmental education. For example:

> Environmental education is an integrated process which deals with man's interrelationship with his natural and man-made surroundings, . . . Environmental education is intended to promote among citizens the awareness and understanding of the environment, our relationship to it, and the concern and responsible action necessary to assure our survival and to improve the quality of life (U.S. Environmental Education Act, 1970).

And again:

> Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality (Carson, 1971, p. 78).

Environmental education has three essential characteristics:

i) awareness of the interrelationship between man and his total environment;
ii) concern for the quality of life; and
iii) commitment to environmental conservation.

The first two characteristics are clearly compatible with home economics, at least in principle; but where the practice of home economics education most often has differed from environmental education has been in the way these two common characteristics have interacted with the third. For example, among many home economists, awareness of man's interrelationship with his natural environment has been focused on what man can extract from that environment for his own comfort and convenience. Similarly, concern for the quality of human life has often led home economists to promote a certain standard of living dependent on high energy use and processed materials. The environmental impact of saving human labour has virtually been ignored:

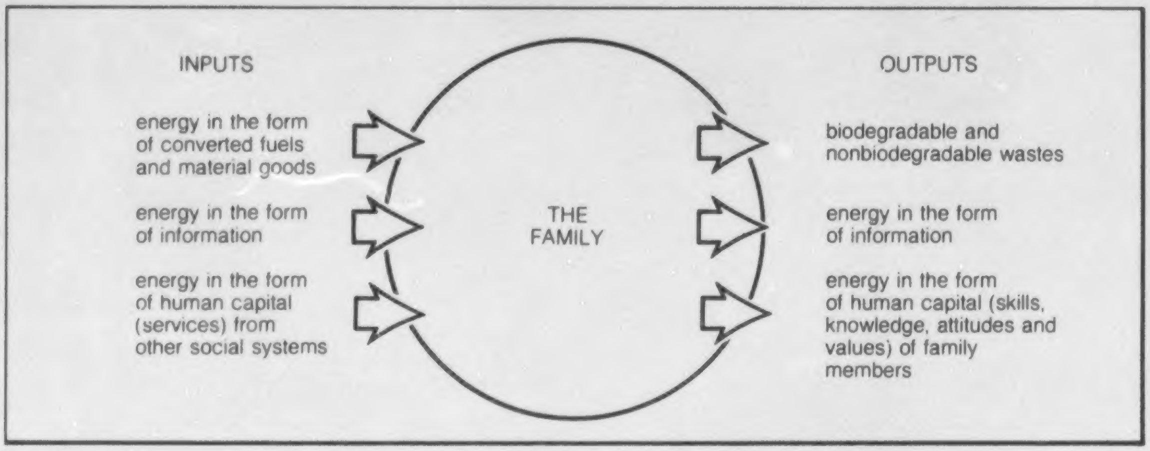
> As home economists, we have been concerned with the short-run costs and benefits for families of technological innovations and the products that result from these innovations, and we have not looked beyond to the problems created by the technological revolution. It is now evident that we must assess the household energy inputs and outputs in terms of the environmental constraints that we have ignored (Paolucci and Hogan, 1973, p. 13).

A commitment to environmental conservation is compatible with the home economist's concern for the quality of human life, but achieving that commitment may involve a change in the images of quality that home economics promotes. For example, home economics has been an active agency in promoting the benefits of labour-saving electrical appliances. One junior secondary home economics textbook (which is currently in vogue in many Australian secondary schools) includes a section which promotes automatic washing machines, dishwashers, clothes dryers, frost-free refrigerators, and the like, as part of 'a scientific approach to homemaking'. The author claims that 'in the economically advanced countries . . . women enjoy the results of technological advances in laundry appliances', and makes similar claims for numerous kitchen appliances. Such statements carry with them the implication that homemakers ought to aspire to the acquisition of these 'technological advances'. Apart from the fact, overlooked by the author, that in our own 'economically advanced' country there are still people who cannot afford these appliances, the author ignores the possibility that there might be people who, for a variety of reasons, do not want them (e.g. I know of at least one home economist who decided to use a nearby laundromat rather than purchase a washing machine following a cost/benefit analysis of both methods as they applied to her situation). However, the important point is that such textbooks completely ignore any consideration of the environmental consequences of producing and operating the appliances dealt with.

Home economics teachers are in a position to influence patterns of family resource usage in many areas which significantly affect environmental quality: housing, food, clothing and leisure, in particular. The immediate challenge of the world-wide energy shortage for Australian families is how to live well while using less of a resource that is part of almost everything we consume. Meeting that challenge involves not only changes to our patterns of energy usage but also changes in our concept of what it means to 'live well'. What can home economics teachers can do to help individuals and families in managing these changes?

## A Model: The Family as an Energy-Driven Ecosystem

The family is a major source of nurture and protection for the individual, and is the principal environment in which attitudes, values, goals and skills are developed. Since the family is a critical decision-making unit in relation to environmental matters, Paolucci and Hogan (1973) believe that it


INPUTS
energy in the form of converted fuels and material goods
energy in the form of information
energy in the form of human capital (services) from other social systems
THE FAMILY
OUTPUTS
biodegradable and nonbiodegradable wastes
energy in the form of information
energy in the form of human capital (skills, knowledge, attitudes and values) of family members

***The family as an energy-driven ecosystem*** (after Paolucci and Hogan, 1973)

may also be helpful for home economics teachers to view the family as an *energy-driven ecosystem* in which family members are inextricably linked to the environment through energy flows.

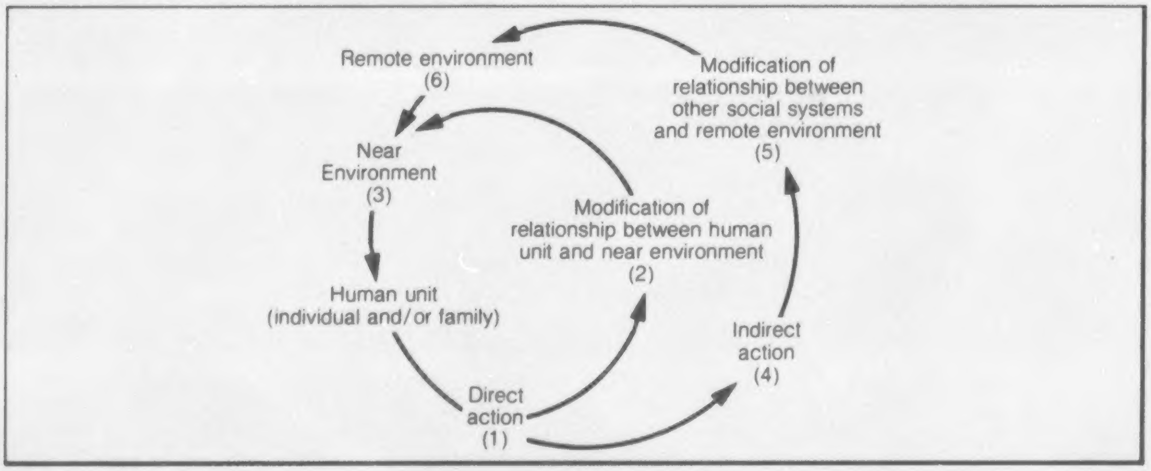
As a group of organisms, the family is related to other social and economic groups by mutual access to specific energy sources (oil, electricity, gas) and by participation in a network of nutrient and information flows, such as the behavioural information (family attitudes and values, consumption practices) necessary for the efficient use of energy (Blackburn, 1973). Thus, to perform the functions expected of them in our society, families become primary converters of energy in the processes of socialisation and consumption.

Understanding the family as an energy-driven ecosystem is one way of putting into perspective the human and physical energy trade-offs that are made in decisions about family resource management. For example, the increased flow of energy across family boundaries in the form of material inputs (e.g. convenience foods, easy-care fabrics, electrical laundry appliances) has tended to diminish the *human* energy expended by most families. Understanding the family in this way also helps in assessing family energy inputs and outputs in terms of environmental constraints, e.g.

- the limited supply of natural resources
- the limited capacity of physical-energy systems to supplement human energy
- the limited capacity of the earth to assimilate wastes.

The interactions between families and environment are far-reaching in their effects, and the model presented in Figure 15.1 requires some supplementation if it is to reflect these interactions. Man and environment mould one another, and their interactions are part of a continuing sequence of events.

***Interaction between man and the environment***


Remote environment (6)
Modification of relationship between other social systems and remote environment (5)
Near Environment (3)
Modification of relationship between human unit and near environment (2)
Human unit (individual and/or family)
Indirect action (4)
Direct action (1)

The effects of human action on the environment are diverse and people are often unaware of the extent of their indirect action. Furthermore, the effects of remote changes in the environment are often so far removed from the experience of the individuals, families or societies causing them that they may seem to be unimportant. But, as the effect of certain aerosol propellants on the ozone layer of the earth's atmosphere seems to suggest, such remote changes may eventually return to their source in unexpected forms.

Decisions made at the individual or family level contribute to the part man plays in creating the world in which he lives, and thus contribute also to determining what kind of organism man will become.

Thus, an ecological view of family energy resource demands an understanding of the role families play in shaping, and being shaped by, the forms and amounts of energy they consume. That is, a family's values, goals and energy resources are interdependent:

> [T]he preservation of a system of values requires a continuous supply of energy equal to the demands imposed by that system of values. Conversely . . . changes in the amount or form of energy available give rise to conditions likely to result in changes in values, for men who share common values make similar changes in choice when faced with similar changes in the consequences of their acts. These changes in choice are influenced not only by the values . . . but by changed limits as to what is physically possible (Cottrell, 1955, pp. 4-5).

Perceiving the family as a high energy use ecosystem also acts as a guide to the kinds of information we must encourage families to seek. If families are to be environmentally responsible consumers, they will need to seek, and be able to obtain, information about the energy costs of processed material goods, the recycling potential of goods, and the costs such recycling will entail. Unfortunately, whilst it is often easy to cost goods in limited financial terms, it is less easy to assess the energy required to process the food in a bag of groceries that might contain frozen chicken, dried soup mix, canned vegetables, packaged cheese, and bottled fruit juice. Nevertheless, such considerations are highly relevant to family resource management. Family energy budgets should receive as much of the home economics teacher's attention as money and time budgets have in the past.

There is very little information available in Australia about the ways in which families use energy in their homes and about the variables that affect energy use. But until research reveals more about family environmental decisions, home economics teachers can at least promote enquiry and curiosity about family energy consumption. We do not have to agree on what constitutes a specific 'waste' of energy in order to consider the possible alternatives to our present pattern of doing virtually everything with the aid of non-human energy. Such considerations may help our pupils to clarify their own values with respect to the man-environment relationship and to set priorities for the use of limited energy resources.

For example, washing clothes is just one area of household decision-making loaded with issues of environmental import. We cannot depend, unfortunately, upon the accuracy of information supplied by manufacturers, who may be only too willing to supply ample information about the environmental impact of their product (and who have the financial resources to make such information appear to be convincing). Depletion of forests competes with hygiene as an outcome of decisions regarding the use of disposable items. Clearly, there is no one right or responsible decision.

Without accurate information about energy costs and consequences of everyday household decisions, we can only speculate on the environmental impact of these decisions. And even if such information were available, a more accurate description of environmental consequences would only be a first, and probably insufficient, step in providing the knowledge and skills necessary to the achievement of essentially attitudinal aims. If pupils are to be convinced of the significance of the information available, to the extent that it affects their judgements, they need to experience the consequences of their actions in performing tasks and using resources. They need to practice the skill of anticipating outcomes, especially in being able to see all household decisions in terms of what resources are used in relation to the satisfaction achieved: that is, a cost-benefit relationship in which cost is measured not only financially but also aesthetically and in relation to the depletion of that resource and its consequent unavailability for alternative use. Being aware that there are alternatives in the use of resources, and seeking these out, is a prime component in achieving an informed outlook and a responsible attitude regarding family-environment interactions.

## The Teacher's Attitudes and Values

It almost goes without saying that the attitudes and values of the teacher are crucial to the encouragement of environmental responsibility in pupils. The teacher is not only an example, a role model, to the pupil; the teacher's attitudes will also determine what emphasis will be given to environmental matters in the course of a given lesson. Environmental education is not just another topic to be included in a home economics course but, rather, it is a dimension of home economics teaching and learning. Consideration of consequences to the environment should be an integral part of every curriculum unit, whether the topic be related to foods, clothing, human development, family finance, or whatever. Such considerations need not be the central teaching point of the lesson: even peripheral points can help to maintain a level of environmental awareness in pupils. For example, it is common for home economics teachers to treat convenience foods as a separate topic, although such foodstuffs are used almost continually, in one form or another, in the home economics classroom. Whenever convenience foods are used, the opportunity arises to bring to pupils' attention the question of packaging in relation to cost; if the teacher, at least on some occasions, draws attention to the fact that the cost of packaging may be considered in terms not only of money but also of depletion of resources and the environmental impact of waste disposal, pupils may be more likely to consider these implications when making their own purchasing decisions. That is, the environmental consequences of the use of convenience foods should not only be considered for the duration of that topic.

Tests and examinations provide another example of ways in which environmental issues can be kept in view. It is common practice in home economics education to test pupils' understanding of management concepts by asking them to analyse a case study; such case studies provide the opportunity to introduce environment-related topics, as is illustrated by the test items below (taken from the Year 12 October Test in Higher School Certificate Home Economics — Human Development and Society, Incorporated Association of Registered Teachers of Victoria, 1978). These items, whilst testing pupils' ability to exemplify such concepts as 'short term goals', 'resources', and 'alternatives in decision-making', also serve to remind pupils that time, money, and human energy are not the only resources to be saved, and that family decision-making may be affected by attitudes toward the natural environment.

A young working mother, Rachel, is faced with a problem which she describes as follows:

> 'Disposable nappies waste natural fibres; automatic washing machines waste water and electricity; and sending nappies to a laundry service wastes money. But I've got to decide on one of these methods, because it takes too long to wash nappies by hand!'

Rachel's short-term goal is to

A. save energy
B. save time
C. obtain cheap laundry services
•D. obtain clean nappies

Which resource has Rachel identified as the most valuable to her?

A. natural raw materials
B. energy
C. money
•D. time

Rachel makes the further comment:

> 'My decision will be based on this: the earth's resources are limited and precious; they can always print more money.'

Taken together with her first statement, this additional information indicates that Rachel

A. should use disposable nappies
B. should wash the nappies by hand
C. should use an automatic washing machine
•D. cannot make a decision unless more alternatives are available

The home economics teacher's attitudes and values will also be instrumental in determining which environmental topics will be regarded as legitimate home economics content. A discussion about saving electrical energy by one pot cooking, or by drying clothes out of doors, seems clearly to belong in a home economics classroom, whereas a discussion about the pros and cons of uranium mining might be considered somewhat remote. Other topics might not be so easy to categorise. Would a home economics teacher be justified in, say, discussing whaling with her class? Consider the following (imaginary) pamphlet (adapted from a Project Jonah pamphlet, c. 1977).

### THE LAST WHALE

He wallowed like a zeppelin
Full of holes.
The solitude of water
drove him mad
And when he landed on the beach
They say he made a thousand packs
of lightly salted margarine.

— Miles Gibson

When Australia's last whaling station, Cheynes Beach Holdings Ltd., was operating, they rationalised their killing of sperm whales by stating that their opponents emphasised 'emotional arguments which can be directed at any industry engaged in the procurement of food for mankind'.

Food for mankind?

Whales were killed in Australia for their commercial products, the oil used as a lubricant in engines that operate at high temperature and pressure, the meat processed into a high protein meal for stock food, and the remainder powdered for fertiliser (used mostly in Western Australia).

The most plausible argument for whaling — if it were true — would be that their slaughter provided much needed protein for human consumption. Indeed, it has been estimated that with proper management the Antarctic might yield two million tonnes of whale meat per year. However, this relates to a bygone possibility, the unabated hunting has made it impossible.

Japan accounted for 42% of the International Whaling Commission's allotted kill in 1973. The domestic market consumed 122 000 tonnes of whale meat, a majority of the world total: 60 500 tonnes were consumed by the general public, 15 000 tonnes used in school lunches, and 46 500 tonnes went into the processing of ham, bacon, sausage, etc., i.e., fed to pigs. Neglecting the protein loss caused by inserting pigs into the food chain between whales and humans, the average consumption of whale meat in Japan was less than 15 grams per person per week — less than 1% of the total protein intake.

The 'food for mankind' argument was even more specious when applied to Australia. Humans find sperm whales (the only kind caught in Australia) inedible. In Western Australia whales were fed only to chickens, pigs and dogs.

As home economists you possess the knowledge and skills to appreciate the speciousness of the 'food for mankind' argument used to defend whaling. Your help is needed.

HOME ECONOMISTS: LET WHALES LIVE!

The point to be noted here is that, whilst it is possible to argue a case for home economists becoming actively involved in saving whales, the likelihood of whaling ever arising (and being pursued) as a topic for discussion in any given home economics class will depend largely on the values and attitudes of the teacher. Nevertheless, at least one professional body (the American Home Economics Association) has endorsed the view that home economists should be 'willing to assume risks in directing change affecting families' by such means as 'taking a stand on controversial issues in one's professional role' (Bivens, *et al.*, 1975, p. 27). Energy usage by families is one such issue that has preoccupied North American home economists for the greater part of a decade. In addition to Paolucci and Hogan, referred to above, Ray (1971) and Montgomery (1973) are some among many home economists who believe that home economics teachers can, and ought to, be involved not only with the short term conservation measures that could be adopted immediately, but also with the long term measure that would mean greater changes in lifestyle and resource use. Although it has been argued that these writers have sometimes adopted a superficial approach to environmental problems (Gough, 1977), their willingness to take a stand on energy issues clearly complements the aims of environmental education.

Finally, it should be stressed that the home economics teacher, through his or her professional concern with the everyday decisions made by individuals and families, can do a great deal to emphasise the significance of small contributions to ecological balance. Environmental problems are frequently presented as being of such magnitude, particularly when they are problems on the global scale, that they tend to make individuals feel helpless and ineffectual. This is certainly the case with many forms of air and water pollution, which are usually associated with industrial waste. Such problems, whilst important, can be ameliorated to a large extent by technological means, and by strict enforcement of regulations. But there are other environmental problems, such as those created by solid wastes which are, in the main, more directly linked with domestic consumption patterns. A government cannot control the output of discarded materials from households in the same way that it can control the discharges of factory waste into a stream. The wastes created by families are a very accurate indicator of the lifestyle of those families; hence, if we adopt a certain standard of living, we will have a certain waste disposal problem (Pausacker, 1975, p. 7).

## IDEAS INTO ACTION: SAMPLE ACTIVITIES FOR TEACHERS AND PUPILS

The sample activities in this section are not organised into units of work but, rather, they comprise a smorgasbord of ideas which might be used to complement other home economics activities. Some activities are relatively self-contained, whereas others need to be supported by additional activities.

### 1. Kitchen waste

Most home economics teachers are in a position to recycle organic kitchen waste. If the school has a garden of some sort, it could almost certainly have a compost heap or bin to which suitable kitchen waste can be added.

Teachers could also consider starting and maintaining, with pupil assistance, a school herb garden which would also profit from the addition of composted kitchen waste. Keep a small waste bin in the home economics centre exclusively for vegetable scraps, eggshells, plate scrapings, peels and cores, leftovers, and so on, and make sure pupils understand why it is there.

### 2. One Pot Meals

There are several ways of cooking whole meals using a minimum number of pots and stove elements (or burners). These range from such quick methods as those used in preparing Chinese food (stir-frying in a wok) to the long, slow simmering techniques used for many stews and casseroles. Some of these methods are clearly energy savers. Investigating one pot meals could be a worthwhile project for a class, small group or individual pupil. Teachers could mention comparative energy costs when discussing or demonstrating different techniques.

### 3. Saving energy and nutrients

Home economics teachers are well aware of the numerous ways in which many foods, such as vegetables, can be robbed of their nutritional value in the course of preparing them to be eaten. Many of the preparation methods which lead to high nutrient loss also have environmental consequences. For example, excessive peeling of potatoes and carrots not only removes important nutrients but also creates a waste problem; lengthy cooking of peas and beans not only leaches out water-soluble vitamins but is also a waste of the heat energy source.

There are many small ways in which home economics teachers, by precept or by example, can encourage pupils not to be wasteful, both in the nutritional and environmental sense. The following structured exercise allows pupils to make their own comparisons between different cooking methods.

*To the pupils:* You will need small quantities of a selection of vegetables, e.g., carrots, silverbeet, peas, beans, zucchini, cabbage, cauliflower. Try to get some of each vegetable you use that are *really* fresh (picked today) and some that are a bit older, and going stale.

Cook a portion of each of the vegetables in the following ways:

(i) steaming—place the vegetables on a wire rack in a saucepan with a small amount of water, or cook in the top part of a double boiler, for 10 minutes.

(ii) boiling for 10 minutes.

(iii) boiling for 45 minutes. Make sure you have enough water so that the pot does not boil dry.

Retain a *fourth* portion of each vegetable uncooked. (Why?)

As the cooking is completed, carry out the following tests and observations. Record all your results in the tables provided.

(a) When the vegetables are cooked strain the water into a cup and mark it (i), (ii) or (iii) as above. Boil *most* of each sample of cooking water dry in a non-burn container. Examine any solid which remains.

(b) Keep the remaining water in the cups and, when it is cool, taste it.

(c) Describe the appearance, taste and texture of each vegetable portion.

Sample Record Sheet for Cooking Experiments

| Vegetable | Cooking Method | | | |
|---|---|---|---|---|
| | | 10 minutes | | 45 mins. |
| Fresh | Raw | Steamed | Boiled | Boiled |
| Flavour | | | | |
| Colour | | | | |
| Texture | | | | |
| Colour of water | | | | |
| Appearance of 'boiled dry' cooking water | | | | |
| Taste of cooled cooking water | | | | |
| Stale | | | | |
| Flavour | | | | |
| Colour | | | | |
| Texture | | | | |
| Colour of water | | | | |
| Appearance of 'boiled dry cooking water | | | | |
| Taste of cooled cooking water | | | | |

*Some questions:*

- Why does the cooking water become discoloured?
- What might the solid be that is left after boiling the cooking water dry?
- Do you think that fresh vegetables are more tasty than stale vegetables?
- What does lengthy cooking do to the appearance of vegetables?
- What does lengthy cooking do to the taste of vegetables?
- What could you serve as an accompaniment to raw vegetables?
- Which of the above methods do you think would keep the most nutrients in the vegetables?

## 4. Water Conservation

Most of us are accustomed to turning on the tap whenever we need water. We tend to take a virtually unlimited water supply for granted.

In a suitable foods practical session, allocate pupils a specific amount of water to be used in the session (for *all* purposes: as an ingredient, for washing up, etc.). Depending on the year level, this could entail setting a measured limit, or could be done by literally banning the tap and requiring instead that pupils use only the water in, say, a given container.

A follow-up session could focus on such issues as:

- how effectively/efficiently water is used in the home;
- conditions leading to 'unnecessary' waste (and what we might *mean* by 'unnecessary');
- simple ways of reducing water waste in the home

## 5. How many containers do you really need?

The following is an open-ended activity for pupils:

What happens to empty cans and bottles?

At the present time, one popular answer is to recycle them. But some people believe that recycling is a rather shortsighted approach to the problem. A better answer might be not to use bottles and cans unless they can be washed and refilled.

To recycle containers we need to mine the materials and acquire the energy to make and run the machines to crush and fragment and melt and remake them, again and again and again . . . Time after time, cycle after cycle, all the material is eventually lost.

It might be possible that, with a great deal less effort, and with a great deal less waste of natural resources, EACH HUMAN INDIVIDUAL COULD BE FURNISHED WITH ALL THE PERMANENT REFILLABLE CONTAINERS THAT SHE OR HE COULD EVER NEED.

What containers *would* you need?
How many?
What capacity?
What would they be made of?

## 6. What a lot of rubbish!

Rubbish surveys of various kinds can be built into home economics units at all year levels. For example, pupils frequently have difficulty in comprehending management models and flow charts because they are too abstract; such models become more meaningful if pupils apply them to a specific situation. Furthermore, if pupils are required to actually measure some of the components of a family management model, as it applies to them, they are more likely to feel that the model has some practical usefulness. The rubbish output from a home is one component of an input-output model that is very amenable to measurement. Thus, a quantitative study of rubbish output could be part of an investigation into the energy conversion aspects of family resource management (see page 73). On the other hand, more qualitative studies of rubbish (from pupils' own homes, or from other people's homes) could be related to concepts and generalisations concerning values and lifestyles. Pupils could, for example, refine and test the hypothesis that 'a family's rubbish is an accurate indicator of that family's lifestyle'.

If teachers wish to give pupils practice in a particular enquiry skill, such as data collection, the school's rubbish provides a ready-made data source. A good 'starter' activity is to organise pupils to survey all the rubbish tins in the school on a daily basis. (Trial surveys have produced results that have surprised both teachers and pupils: one small Victorian rural high school was found to produce, on average, one thousand pages of foolscap rubbish per day.)

Since each classroom has its own rubbish bin, rubbish surveys can be used to introduce, in simple, non-statistical ways, concepts such as sampling and, if daily comparisons are to be made, the need to collect data at similar times each day.

The following is an outline of a structured discussion designed to increase pupils' awareness of domestic waste output, and to engage them in speculation about its origins.

(a) *To the pupils:* You have probably all seen posters and car-stickers saying things like 'Keep Australia Beautiful' and 'Don't Rubbish Australia'. What exactly *is* 'rubbish'?

*To the teacher:* If this is a junior class, it would be a good idea to have a couple of examples of the posters/stickers referred to available to show to pupils.

Pupils will probably respond to the question initially with synonyms, e.g. 'waste', or short phrases such as 'things that you don't need', or 'things that are useless'. Supplementary questions here might include:

— We often pay for things that we later throw away. When does something actually become 'rubbish'?
— Is *all* 'rubbish' useless?

It does not particularly matter how pupils express themselves here, but they should be encouraged to realise that:

i) there are many different kinds of rubbish, e.g., sewage, solid waste; and

ii) what we call rubbish, i.e., all the material which has ceased to be of any use to a particular consumer, or group of consumers, is not necessarily useless (e.g. in China there appears to be no such thing as rubbish from domestic households).

(b) *To the pupils:* Where does rubbish come from? Who, as a group, do you think creates the most rubbish?

*To the teacher:* These are brainstorm questions, and all answers should be accepted. The second question may require supplementing if pupils do not see it in terms of private homes versus industry. However, it is likely that many pupils, especially in senior forms, will be inclined to blame industry and commerce for much of the community's rubbish.

(c) *To the pupils:* Some information has been collected on the quantities of waste generated by various sources. Look at Table I. According to this information, which section of the community produces the greatest amount of solid waste?

**TABLE 1: *Quantities of solid wastes generated in greater Melbourne***

| Category | No. of cubic metres generated for year ended 30 June 1973 | kg/head/day |
|---|---|---|
| (a) Household wastes: | | |
| (i) regular collection | 2 133 000 | 0.95 |
| (ii) other residential rubbish | 499 000 | 0.23 |
| (iii) garden waste | 178 000 | 0.09 |
| (iv) litter and receptacle waste | 104 000 | 0.04 |
| (v) all other material | 467 000 | 0.23 |
| | 3 381 000 | 1.54 |
| (b) Industrial wastes (handled by waste collection companies) | 627 000 | 0.27 |
| (c) Commercial wastes (handled by waste collection companies) | 502 000 | 0.23 |
| (d) Cover materials | 519 000 | 0.23 |
| | 5 029 000 m$^3$ | 2.27 |
| *less material incinerated at suburban garbage destructors* | 306 000 | |
| *TOTAL VOLUME OF MATERIAL DEPOSITED IN MUNICIPAL SITES* | 4 723 000 | |
| plus material deposited at private sites: industrial | 441 000 | 0.23 |
| commercial | 172 000 | 0.09 |
| *TOTAL SOLID WASTE GENERATED IN GREATER MELBOURNE* | 5 642 000 m$^3$ | 2.59 kg/head/day |

*To the teacher:* Put table on OHP transparency, chalkboard, or duplicated sheet.

Clearly, household rubbish accounts for the greater part of Melbourne's solid wastes (N.B. this information was modified from Pausacker, 1975, p. 85; similar data should be obtainable for other major cities).

(d) *To the pupils:* As you can see, total solid waste generated in Melbourne in 1973 was 5 642 000 cubic metres, or about 1.5 million tonnes. This represents nearly 2.6 kilograms of material discarded by every person each day. Now, let us see if we can do anything about this waste. Since households create the most solid waste, we should start with our own homes. What do you think accounts for the majority of household rubbish?

*To the teacher:* Again, let pupils brainstorm this question. Try to get them to make rough quantitative estimates (rank order is sufficient) of the forms of waste they mention. Record these on the chalkboard for later comparison with actual proportions.

(e) *To the pupils:* A number of studies on the composition of household solid waste have been carried out in Australia. The results are all fairly similar. Table I shows the results of a detailed analysis of household solid waste undertaken by the Environment Protection Authority in Victoria in 1973-74 (Pausacker, 1975). All values are percentage by weight.

**TABLE II: *Composition of household solid waste***

| | |
|---|---|
| Putrescibles (e.g. food wastes) | 33% |
| Paper and paperboard | 33% |
| Glass | 16% |
| Garden waste | 8% |
| Metals | 6% |
| Plastics | 2% |
| Miscellaneous | 2% |
| | 100% |

Look at each of these categories of waste, and think about your own homes. What sorts of things are you throwing away to make up these amounts of waste?

*To the teacher:* This question is aimed at getting pupils to think of specific examples for each category. Comparisons with their predicted proportions may also be useful at this stage.

(f) *To the pupils:* We all have some control over waste disposal. For each of the things we have identified as rubbish, let us try to think of alternatives to throwing it in the rubbish bin. Which categories of waste can we — as individual homemakers — do most to reduce?

*To the teacher:* Much of the ensuing discussion will be speculative, but try to get pupils to make specific suggestions. For senior forms it is probably worth eliciting the notion that there are two broad alternatives:

i) not designating the item as rubbish (e.g. eating unpeeled potatoes rather than creating waste by peeling them);

ii) recycling/reusing the item either within the home or in the community (e.g. newspapers, bottles, aluminium cans, etc.).

It should become clear to pupils through this discussion that one of the largest categories — putrescibles — can be reduced substantially, particularly if composting is a workable alternative in the home. (Senior pupils might also consider the environmental costs/benefits of disposing of putrescibles through municipal waste collection and through the sewage system, e.g. by using an 'insinkerator' type of waste disposal unit.) It should also become clear that the majority of household waste is food related — whether it be food as such, or packaging — and that decisions made when purchasing and preparing food can significantly affect the amount of rubbish a home produces.

## 7. Food cycle energy steps

The following activity aims to enable pupils to isolate energy consuming steps in the food system and to speculate as to the different ways in which energy could be saved.

Thirteen steps in a food system are listed below for a frozen vegetable.

1. Someone else grows a vegetable . . .
2. transports it to a processing plant . . .
3. where it is sliced by machine . . .
4. it is packaged . . .
5. it is frozen . . .
6. a refrigerated truck takes it to a store . . .
7. store keeps it frozen . . .
8. you drive to store to buy it . . .
9. take home and freeze it . . .
10. thaw it . . .
11. throw away package . . .
12. cook it . . .
13. eat it

Which steps could be eliminated to save energy?

Construct the steps for a canned soft drink and then make suggestions for steps which might be eliminated to save energy.

Possible answers could include:

(i)
1. someone else grows a vegetable . . .
2. transports it to store . . .
3. refrigerates it at store . . .
4. you drive to store to buy it . . .
5. take it home and cook it . . .
6. eat it.

(ii)
1. grow a vegetable in your own garden . . .
2. cook it . . .
3. eat it.

(iii)
1. grow a vegetable in your own garden . . .
2. eat it raw.

This type of visual representation makes a good bulletin board display. Pupils, either individually or in groups, could make up displays for different products. This type of exercise is not limited to food. A similar sequence could be drawn up for, say, a woollen jumper, starting at the sheep. The chain could be reduced by, for example, knitting one's own jumper and/or by spinning wool oneself—not to mention having one's own sheep!

### 8. A cost/benefit analysis of garlic products

Following is an outline of a student worksheet, which could be adapted for other types of food products.

*Aim:* To compare the energy costs involved in the production of various kinds of garlic products.

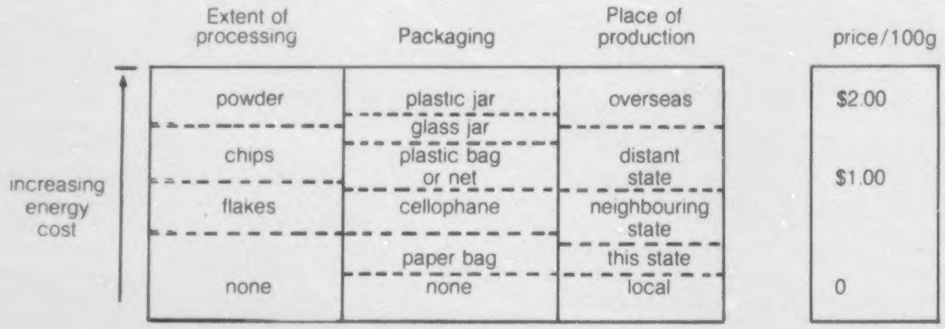
*Activity 1:*

*Visit local shops (supermarket, greengrocer, delicatessen, health and bulk food stores) to find out the different forms in which garlic is sold. Record information about each product in the table below:*

| *SHOP* | *GARLIC VARIETY* | *PACKAGING* | *PLACE PRODUCED* | *QUANTITY* | *PRICE* | *COST PER 100 g* |
|---|---|---|---|---|---|---|
| *e.g. super-market* | *fresh* | *plastic net* | *Vic.* | *85 g* | *55c* | *.65c* |
| | *powder 1* | *cellophane* | *Vic.* | *25 g* | *29c* | *$1.16* |
| | *powder 2* | *glass bottle* | *N.S.W.* | *50 g* | *99c* | *$1.98* |
| *green-grocer* | *fresh* | *none* | *Vic* | *80 g* | *40c* | *.50c* |

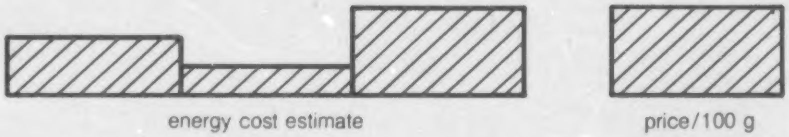
*Activity 2:*

Draw histograms for each type of garlic product, comparing energy cost estimates with price per 100 g. The energy cost estimates can be based on the following guide:

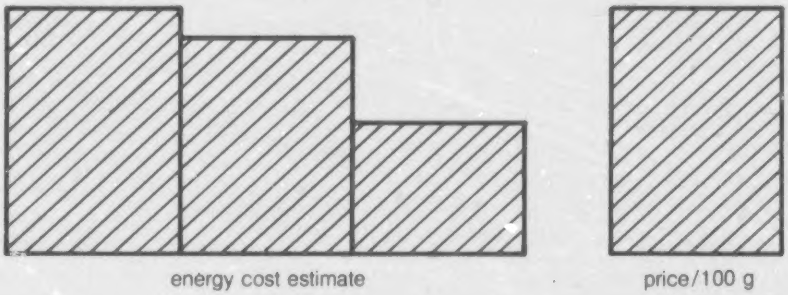

Extent of processing
Packaging
Place of production
price/100g
increasing energy cost
powder
chips
flakes
none
plastic jar
glass jar
plastic bag or net
cellophane
paper bag
none
overseas
distant state
neighbouring state
this state
local
$2.00
$1.00
0

For example:

(1) greengrocer (fresh)



(2) supermarket (powder 2)



*Activity 3 (optional):*

Find out how you would grow garlic at home. Estimate the costs involved. You will need to consider the initial cost of fresh cloves, the approximate quantity of bulbs these cloves will produce, and the cost of your time and energy in planting, watering, and harvesting the garlic.

Ideally, you could actually grow garlic for yourself. Otherwise, an estimate of the 'return on initial investment' can be made in the following way. Obtain one garlic bulb and note its weight and price. Separate the cloves from the bulb and count them. Each clove, when planted, should eventually produce another bulb. Thus, to estimate the amount of garlic you should be able to produce at home from one bulb, multiply the weight of the original bulb by the number of cloves it contains.

*Activity 4:*

Use the results you obtained in Activities 1, 2 and 3 to answer the following questions:

- (i) What effect does processing, packaging, and place of production have on price?
- (ii) Compare the most expensive garlic product with the cheapest. Explain why there is a difference.
- (iii) Which garlic varieties are most wasteful of energy resources?
- (iv) What are the advantages and disadvantages of purchasing each garlic variety?

## 9. An energy menu

This is a consciousness raising activity designed to indicate to pupils the energy costs (as distinct from the money costs) of different foods.

*To the pupils:* Review the items offered in the following menu and select your first preferences based strictly on likes and dislikes. Tick these items in Column 1. Next, make selections from the menu on the basis of your estimate of *least* energy consumption. Remember that the energy cost of a food includes: fertilisers and insecticides, equipment, transportation, processing, packaging, and preparation. Place a tick by each 'low energy' item (according to your estimate) in Column 2.

ENERGY MENU

| | Column 1 | | Column 2 | | Column 3 | | Column 4 |
|---|---|---|---|---|---|---|---|
| | First preferences | | Least energy (your estimate) | | Least energy (actual) | | Differences (+ or -) |
| | (/) | ($) | (/) | ($) | (/) | ($) | ($) |
| Fresh bread roll | ____ | ______ | ____ | ______ | ____ | ______ | ______ |
| Packaged crisp-bread | ____ | ______ | ____ | ______ | ____ | ______ | ______ |
| Butter | ____ | ______ | ____ | ______ | ____ | ______ | ______ |
| Margarine | ____ | ______ | ____ | ______ | ____ | ______ | ______ |
| Continental pork sausages | ____ | ______ | ____ | ______ | ____ | ______ | ______ |
| Fried chicken | ____ | ______ | ____ | ______ | ____ | ______ | ______ |
| Roast beef | ____ | ______ | ____ | ______ | ____ | ______ | ______ |
| Fried rice with vegetables | ____ | ______ | ____ | ______ | ____ | ______ | ______ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Fresh peas | | | | | | | |
| Dehydrated peas | | | | | | | |
| Frozen peas | | | | | | | |
| Canned peas | | | | | | | |
| Fresh apple (home-grown) | | | | | | | |
| Fresh apple (store-bought) | | | | | | | |
| Ice cream with chocolate sauce | | | | | | | |
| Fresh fruit juice | | | | | | | |
| Frozen fruit juice | | | | | | | |
| Canned soft drink | | | | | | | |
| Glass of milk | | | | | | | |
| Flavoured milk carton | | | | | | | |

Now indicate the 'price' of each item you chose by reference to the Energy Price List below; determine the total bill for your meal. In Column 3 tick the 'cheapest' item in each major category (e.g. main course, drinks). Are any of these the items you estimated as being 'least energy' items? To discover how you might have saved energy, find the differences between the items in Columns 1 and 3 and enter these in Column 4. The differences will be losses or gains in costs. Add the total 'pluses and minuses' in this column to find total energy savings. If you were to select items for Column 1 (first preferences) again, would your choices to any different?

ENERGY PRICES (Prices are proportional to actual energy expenditure)

| *Item* | *Price* | *Notes* |
|---|---|---|
| Fresh bread roll | 10c | Packaged food is more energy-intensive than unwrapped foods. |
| Packaged crisp-bread | 15c | |
| Butter | 15c | |
| Margarine | 5c | |
| Continental pork sausages | $1.60 | Animals are inefficient converters of protein. A kilogram of meat requires about four times the energy to produce and market as a kilogram of vegetable protein. Some animals are more efficient converters than others. |
| Fried chicken | 96c | |
| Roast beef | $1.48 | |
| Fried rice with vegetables | 45 | |
| Fresh peas | 12c | Processing requires energy; freezing and dehydration especially require large amounts of energy. |
| Dehydrated peas | 92c | |
| Frozen peas | 31c | |
| Canned peas | 23c | |
| Fresh apple (home-grown) | 3c | Home-grown apple saves commerce and transport. |
| Fresh apple (store-bought) | 19c | |
| Ice cream with sauce | 75c | Freezing uses energy. |
| Fresh fruit juice | 12c | Freezing and storing use energy. All forms of packaging, especially those which do not lend themselves to re-using or recycling, have a high energy 'cost'. |
| Frozen fruit juice | 46c | |
| Canned soft drink | 45c | |
| Glass of milk | 34c | |
| Flavoured milk carton | 50c | |

## 10. Exploring energy ethics

*To the pupils:* Below you will see a list of items and activities which require energy for their manufacture, use and disposal. Number (rank) these items in order of their importance and necessity to you. Mark your responses in Column A—number 1 being most important, down to number 20 for least important.

| A | | B | C |
|---|---|---|---|
| | watching television | | |
| | hot water for bathing | | |
| | electric toothbrush | | |
| | electric toaster | | |
| | synthetic clothing | | |
| | reading a book | | |
| | eating a raw apple | | |
| | take-away pizzas | | |
| | driving to the supermarket | | |
| | drive-in movies | | |
| | making home-made ice cream | | |
| | talcum powder | | |
| | aerosol deodorant | | |
| | electric hairdryer | | |

________bicycle riding ________ ________
________a walk in the sun ________ ________
________chocolate ________ ________
________night football games ________ ________
________hot lunches ________ ________
________school buses ________ ________

Now that you have ranked these items according to their importance to you, go back and rank the ones you feel are *most energy intensive* in Column B (from 1 to 10). Discuss your answers in Column B (from 1 to 10). Discuss your answers in class.
Now mark in Column C the items you could do without which would help the community conserve energy. Discuss your answers in class.

### 11. What did we do before we had . . .?

*To the pupil:* Below you will see a list of energy consuming products and appliances. In Column A, tick the items you have at home now. In Column B, number (rank) these items in terms of their importance and necessity to you at the present time (number 1 being the most important, and so on). Ask your parents if they had these items in their homes when they were your age (about 1945), and tick these items in Column C. Ask your grandparents (or someone of about their age) if they had any of these products in their homes when they were your age (about 1915) and tick these items in Column D.

| Item | A (in home now) | B (importance) | C (in home *c.*1945) | D (in home *c.*1915) |
|---|---|---|---|---|
| 1. Refrigerator | | | | |
| 2. Central heating | | | | |
| 3. Television | | | | |
| 4. Motor mower | | | | |
| 5. Clothes dryer | | | | |
| 6. Washing machine | | | | |
| 7. Hot water service | | | | |
| 8. Electric hairdryer | | | | |
| 9. Freezer | | | | |
| 10. Electric or gas range | | | | |
| 11. Electric fan | | | | |
| 12. Air conditioner | | | | |
| 13. Vacuum cleaner | | | | |
| 14. Toaster | | | | |
| 15. Car air conditioner | | | | |
| 16. Car | | | | |
| 17. Dish washer | | | | |
| 18. Blender | | | | |
| 19. Electric toothbrush | | | | |
| 20. Garbage disposal | | | | |
| 21. Electric blanket | | | | |
| 22. Electric frypan | | | | |
| 23. Record player | | | | |
| 24. Electric razor | | | | |
| 25. Radio | | | | |
| 26. Automatic garage door opener | | | | |
| 27. Electric mixer | | | | |
| 28. Electric carving knife | | | | |
| 29. Electric can opener | | | | |
| 30. Torch | | | | |
| . . . (add to list if desired) | | | | |

Are any of the items which you have marked as important and necessary to you among the items that your parents and/or your grandparents did not have in their homes? Discuss your answers in class.

What *did* we do before we had . . .?
Can we do without them *now*? Discuss your answers in class.

## CONCLUSION

The activities outlined above could be integrated (perhaps after modification or adaptation to local circumstances) into most home programs currently operating in Australian secondary schools. The next and most important step is for home economics teachers to devise their own activities and to try them out in their own classrooms. Some print resources which might be useful in stimulating ideas for activities are appended.

## ACKNOWLEDGEMENTS

I am grateful to Pamela Williams (Department of Home Economics, Rusden State College) and to Gillian Gough (Home Economics teacher, St Albans High School, Victoria) both of whom read the manuscript and made constructive suggestions. Several final year students at Rusden State College have also made valuable contributions: Anne Finlay developed the first draft of the cost/benefit analysis of garlic products, and Cheryl Pym suggested water conservation activities; other constructive suggestions were made by Gayle Quirk, Marian Lee, and Pamela Joyce.

## REFERENCES

Bivens, G., *et al.* (1975), 'Home Economics — New Directions II', *Journal of Home Economics*, May, 26-27.

Blackburn, Thomas R. (1973), 'Information and the Ecology of Scholars', *Science*, 181, (4105), 1141-46.

Carson, S. McB. (1971), *Environmental Studies: The Construction of an "A" Level Syllabus*, National Foundation for Educational Research in England and Wales, Slough.

Cottrell, F. (1955), *Energy Society*, McGraw-Hill, New York.

Gough, N.P. (1977), 'Affective Learning: Environmental Ethics and Human Ecology', *Illinois Teacher*, 20, (5).

Montgomery, J.E. (1973), 'Housing Technology: How Does It Affect the Energy Crisis?', *Journal of Home Economics*, December.

Paolucci, B. and Hogan, M. (1973), 'The Energy Crisis and the Family', *Journal of Home Economics*; December, 16-22.

Pausacker, I. (1975), *Is Recycling the Solution?*, Patchwork Press, Monbulk, Victoria.

Ray, E.M. (1971), 'New Dimensions for Home Economics (Positive Alternatives for the Survivors)' in *Report of a National Conference Sponsored by the American Vocational Association and the American Home Economics Association*, Washington, D.C.

## SOME PRINT RESOURCES

Alves, R. and Milligan, C. (1978), *Living With Energy*, Macmillan, London.

Broadie, R. and Simpson, D. (1978), *Home Energy Saving*, E.P. Publishing, London.

Clements, P. (1978), *Day-to-Day Ecology in Your Home*, Ure Smith, Sydney.

de Ropp, R.S. (1975), *Eco-tech*, Dell, New York, 1975.

Gin, M. (1977), *One Pot Meals*, Pitman, London.

Hodgson, M. (1973), *The Quick and Easy Raw Food Cook Book*, Grosset and Dunlap, New York.

McInnis, N. (1972), *You Are an Environment: Teaching/Learning and Environmental Attitudes*, Illinois Centre for Curriculum Design, Chicago.

Richardson, M. (1978), *Your Own Resources*, Doubleday, Sydney.

Smallternatives' Working Group, (1977), *Smallternatives' Personal Guide to Saving Energy and Money*, Smallternatives' Working Group, London.

# *DANCE/DRAMA AND ENVIRONMENTAL EDUCATION*

*Molly Hall*

---

## PREAMBLE

Molly Hall takes as her start point the view that dance is fundamental to the human experience and from this develops an exhaustive list of ways by which dance can be used to heighten children's experiences of their environment. Her suggestions are organised under three AREAS — natural, historical, man's influence — each of which has several dimensions or ASPECTS.

---

## INTRODUCTION

If environmental education is a total concept of developing feelings for the interrelationship between people and their environment, then the importance of Dance/Drama in environmental education can best be illustrated by the lives of primitive tribes. These people lived close to the soil and were very much a part of their immediate environment. Dance was an integral part of their daily existence. They sang and moved rhythmically as they pounded the grain; they danced to ensure that the hunt was successful and danced again on their return from hunting; they wailed and danced at the death of a relative, or the birth of a child; they danced to their various gods for rain, hope, security and protection from evil, and they danced to greet friends and also to farewell them. Their comparatively simple life-style enabled them to be very much in tune with nature. The rhythms of night and day and the seasons influenced their daily activities and perhaps it seemed natural to compliment nature's rhythms with their own.

Today, man has lost touch with his environment. His sophisticated lifestyle has enclosed him a sort of space capsule, insulating him against the world. Observe a freeway from a footbridge and watch thousands of cars, most only with one occupant, speeding along, almost oblivious of the landscape around him, immune to the rise and fall of the land beneath him, the elements above him and his fellow man alongside him.

The essence of life is rhythm — heart-beat, pulse, blood-flow; day and night, the seasons; crop rotation; ticking clocks and whirring machinery; war and peace, change of governments; decaying and rebuilding of cities; ebb and flow of oceans; life and death.

The essence of Dance is rhythm. Dance is, therefore, an integral part of man's existence and through Dance he can learn much. Like primitive man, modern man can, given the opportunity, become very close to his immediate environment and feel himself once more a part of the total.

I hope some of the examples that follow will help others to see how Dance can play a major role in interdisciplinary education and how important it can be in developing the interrelationship between man and his environment.

## DEVELOPMENTAL IDEAS FOR DANCE/DRAMA IN ENVIRONMENTAL EDUCATION

Because of the enormity and complexity of this topic. I have for convenience divided the role of Dance/Drama in environmental education into three major AREAS. However, one does not have to view each as being separate and complete. Each is an integral part of the whole, but I feel that it is important in a subject like Dance to have some definition and clarity. If the topic chosen is too wide and nebulous, the aim can often be lost. Each of the three major AREAS has a number of ASPECTS which are ideas and starting points. Teachers can choose an ASPECT which they feel is relevant to the students' abilities and interests. The three major AREAS in which I see Dance/Drama in relation to environmental education are:

A — NATURAL

B — HISTORICAL

C — HUMAN'S INFLUENCES

*Being a kangaroo with the aid of simple costumes*

*Being a fish*

The ASPECTS related to each AREA can be approached in many different ways, according to the age, ability and aptitude of the students involved. For example, in relation to ASPECT 2 — Animals, in AREA A — young children enjoy being the *actual animal*. They will hop like a kangaroo, hold their arms bent with hands curled, wrinkle their faces, 'wash' their ears and scratch their tummies, box with each other and nervously look around. Older students, however, can be encouraged to *isolate the movement qualities* of the kangaroo and create individual, partnered or group dances based on rhythmical leaps and bounds, fine, indirect movements made with different body parts, sudden changes of direction meeting and parting following a leader. More abstract ideas could eventuate from studying the life of the kangaroo, and group dances based on the *emotions* of aggression, nervousness, playfulness, fear and loneliness, could be created.

To give detailed and specific examples of how each ASPECT of each AREA might be developed could, I feel, encroach upon the teacher's own creativity and imagination, and obviously as a result, stilt the student's opportunity of inventiveness too. I shall therefore deal with two or three ASPECTS from each AREA in detail and

*Interpreting the emotions of a fish during the catch*

merely list motivational ideas and possible themes of the others. I hope this approach will still convince teachers of the value of *movement* as a means of helping the students become more aware of and more caring in their relationship with their environment.

Broadly speaking, most ideas can be developed by the following methods:

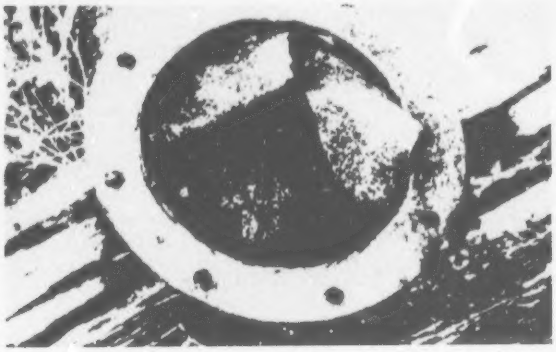
(a) *mimicking* the actual movements
(b) isolating the *movement qualities*
(c) *developing the dramatic* aspect of a situation
(d) a *humorous* approach

Motivational ideas and stimuli for Dance and Drama are many:

- a newspaper headline, a novel, a word
- a painting or sculpture
- a film or advertisement
- music and natural sounds
- exposure to the elements
- tactile experiences of surfaces
- scientific and geographical reports
- the school and its environs
- zoos and museums
- ocean visits and wilderness treks
- factories and building sites
- simple costumes and props
- airports and railway junctions
- markets and shopping centres
- rubbish tips and gardens

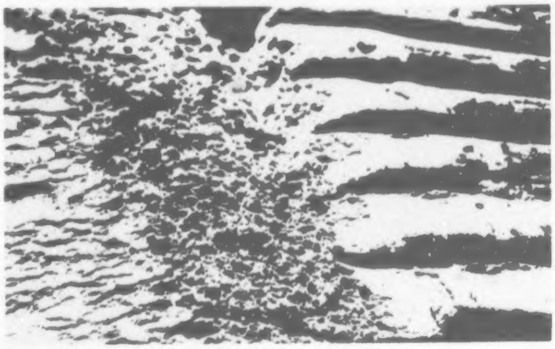
These are but a few which could be used for stimulating or adding another dimension to dances and dramas which so often are only experienced within the classroom.

## Texture, Line and Shape as a Stimulus for Movement



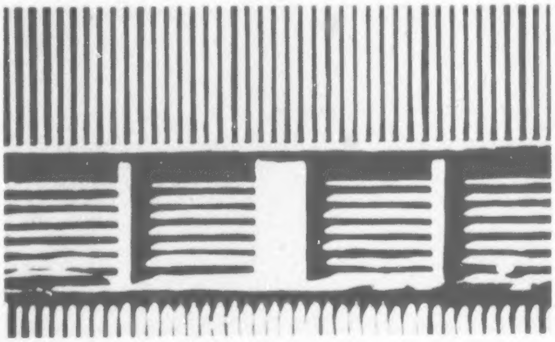
*Contrasting shapes and textures in a tree trunk and a metal ring*

*Fine lines and reflections — stimuli for partner dances*



*Contrasting shapes and patterns in sand*

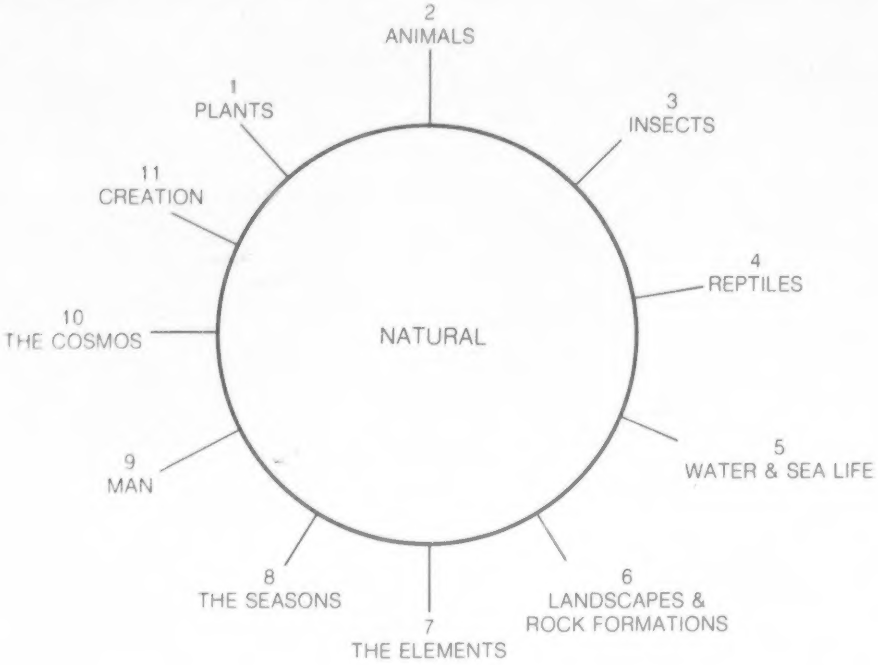
*An old building — a stimulus for movement on themes of horizontal and vertical forms and directions*



## THE DIVISION OF DANCE/DRAMA IN ENVIRONMENTAL EDUCATION INTO AREAS AND THEIR RELATED ASPECTS

## AREA A — NATURAL

This AREA deals basically with Nature. Some of the ASPECTS or divisions which can be made into this broad topic are set out below.


2
ANIMALS
1
PLANTS
3
INSECTS
11
CREATION
4
REPTILES
10
THE COSMOS
NATURAL
9
MAN
5
WATER & SEA LIFE
8
THE SEASONS
6
LANDSCAPES &
ROCK FORMATIONS
7
THE ELEMENTS

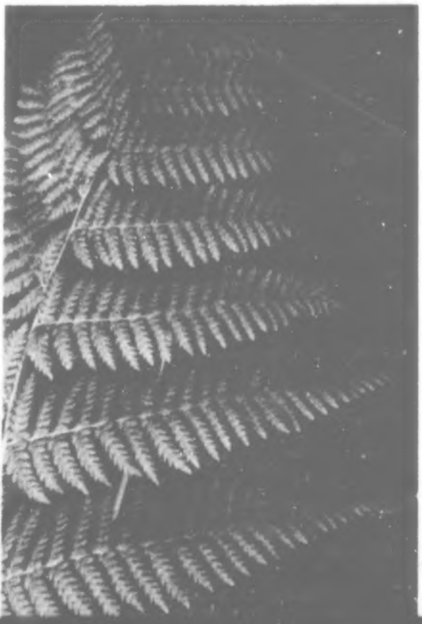
### ASPECT 1 — Plants

Through actual observation of plant specimens, photographs, films and drawings, familiarity with different plants can be established. If the students grow their own plants from seed in water in glass containers then they can observe plant growth and formation both above and below the soil line.

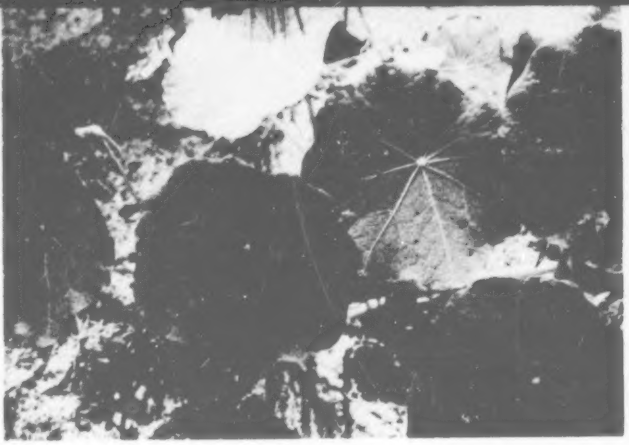
Shapes of leaves and petals can be used as a stimulus for group formations. The effect of light and heat upon leaves could motivate individual and group dances, on themes of Opening and Closing, Curling and Stretching, Simultaneous and Successive body flow, Following the Sun and Avoiding the Sun.

*Angular, sharp, fine*

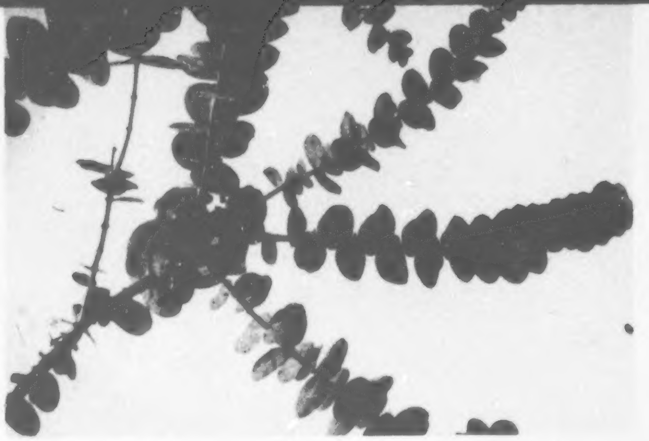
*Delicate and soft*



*Succulent, curved*



*Lines radiating*



*Circling and spinning*

The colours of flowers could be used in a symbolic way to create a dramatic situation by interpreting the different colours as emotions. For example: red — fiery, tempestuous; pink — jollity; blue — serenity or aloofness; yellow — happiness or fear.

*A flower dance*

Also flowers can be personalised to create humorous and dramatic situations. The freesia might represent a gentle old lady; the rose — a royal personage; the snowbell, a delicate, shy, young girl; a creeper or vine — a clinging, possessive person; the bird of paradise plant — an exotic, flamboyant person.

*Interpreting the shape of a spiky fern and a twisting vine*

*Developing these shapes into a dramatic dance*

Rough, angular flat surfaces and deep rifts

Fine-grained, linear and twisting

In the same way the shape and stature of trees can be interpreted to create interesting movement ideas.

The texture of bark too can be interpreted into movement. If the students first touch the smooth bark of a Ghost Gum, the soft flakiness of a Paper Bark, the rough, broken surface of a Peppermint tree and the smooth, downy surface of a young Caesia they can then create sequences of gently flowing movements and strong, angular movements. Partner dances based upon the contrast of the different textures of bark would be an example of how, from something real, an abstract or lyrical dance situation could evolve.

Other dance and dramatic ideas originating from the observation of plant life could be: shooting up, twisting around, creeping along, climbing up, spreading out, decaying and dying. Movement themes related to pathways and directions could be created from observation of branches and veins in leaves and the spreading and propagation of certain plants.

Plant life in general could be used as the starting point for dances and dramas on such themes as The Harvest; Forty Three Beans in every Cup; Bachhanalia; From Grass to Milk; The Origins of a Matchstick; Vegetable Curry; Midget-men from Mushroom Lane; Why Does Everyone Keep Treading on Me.

A group dance based on the angles in the school building and curves in the tree trunks

Interpreting the angles found in trees and shrubs

### ASPECT 2 — Animals

This ASPECT will not be dealt with in detail. Some ideas have been outlined. Further ideas are listed below.

- Being the actual animal.
- Isolating the movement qualities of the animal(s) and transposing them into lyrical and abstract dances.
- Dances and dramas based on legends and myths, descriptive passages from novels and accounts written by explorers.
- Thought-provoking questions like 'What happens to you when there is a bush-fire?', can stimulate the mind to think beyond the actual animal and to see how such an animal is a part of the total environment and how too, man plays a role in this total scene.

### ASPECT 3 — Insects

As for the previously mentioned ASPECTS but also, by encouraging the students to observe colonies of various insects, *comparisons* can be made between the insects' world and that of humans. Very dramatic and also very humorous dances could be created.

### ASPECT 4 — Reptiles

Although many reptiles come to mind, I have taken the snake as an example for movement theme in this ASPECT.

- The *symbolic* significance of the snake could give rise to dance and drama on the themes of Evil and Healing.
- Abstract and lyrical dances could evolve from the many movement qualities isolated from the snake. For example, gliding and flicking, rising and sinking, climbing and stretching, swaying and whipping, constructing and crushing.
- Repetitive sequences can be based on the patterns and shedding of the skin of a snake.
- Hibernation could evoke simple and complex dances on a theme of moving and stopping.

### ASPECT 5 — Water and sea life

This ASPECT provides endless examples of ideas for Dance and Drama. Each visit to the ocean, lake, swamp, river and estuary could provide new and exciting ideas, such as:

- the trickling, splashing, gurgling, cascading and rippling motion of water
- rivers, changing the shape of the landscape as they cut their way through rock strata, meander along the flood plain and leave behind billabongs and backwaters
- the river's change of pace of flow and volume: the dissipation and spreading to form an estuary, the flooding and the drying up
- the scouring and polishing of rocks and pebbles
- the life of the river itself — at first young and playful, then maturing and steadying and eventually dying as it loses itself into the ocean

*MUD feeling it between the fingers and toes*

*A lyrical situation developing*

*A dramatic dance about to unfold*

*Rough rocks, seaweed, sand and water offering a variety of stimuli for movement*

- the ocean in all its moods — soothing, indulgent, frightening and powerful
- the sea spray and wave formations, and the pounding of the sea upon the cliffs
- plant life in the ocean and river can provide stimuli for movement too. The way the motion of the sea or river influences the movement of the plants — bent flat as water rushes over them, undulating as ripples stir them
- the microscopic plant and animal life found in water can be fascinating, and imitating the spasmodic and irregular movements, the meeting and parting and growing and developing of such life, can give rise to interesting experiences
- the metamorphosis of the tadpole into a frog, larva into a dragonfly and the use of such aboriginal legends as "Tiddalik the Frog" can create informative and often humorous dances and dramas
- the movements of fish, both individual and in shoals and schools, are ideal topics for group dances. Tiny fish with their quick, darting movements and changes of direction, heading to the surface for air, lurking in the seaweed for shelter, swarming en masse, carried this way and that by their leaders, apparently nervous and fearful of being eaten, are ideal subjects for the development of dances for all age groups
- in contrast, big fish and whales, far down in the deeper, colder waters, often alone, but often too in schools or shoals, protecting each other from their predators, can give rise to dances based on themes of
  — stillness and sudden action
  — sustained, direct pathways
  — slow, graceful, indirect movements

Other dances and dramas could be based upon:

- the playfulness of the porpoise, leaping, diving and rolling in the water
- the jellyfish propelling itself in a series of contractions and expansions
- the octopus, waving its tentacles, curling and stretching, waving and reaching and snatching its prey
- the shark, sleek and direct

Numerous stories, legends, poems, paintings and etchings have captured the sea in all its moods, and any of these stimuli could be used to create dances and dramatic situations, each one used greatly adding to the student's awareness of this life-giving force.

### ASPECT 6 — Landscapes and formations

A few examples relating to dance and drama in this ASPECT are:

- By contrasting the shapes of different landscapes — gently folding hills, jagged mountain chains, humpbacked monoliths, flat wastelands, etc. — many interesting movement ideas could be developed.
- Dances could be created on the patterns found in parched, cracked earth and wave-washed sand.
- Crystal formations and colours could be explored.
- So too could the mood created by different landscapes — menacing, relaxing, lonely, etc.
- Dramatic situations in particular could be stimulated by such things as — the evolution of mountain chains; volcanic eruptions; folding, faulting, warping and splitting of rock strata; the formation of gorges and mesas, and the weathering away to a peneplain.

### ASPECT 7 — The elements

Throughout the history of Dance, the elements have always provided a rich source of inspiration. Myths, legends, scientific experiments and studies in climatology and agriculture provide added stimuli for Dance and Drama in this ASPECT.

Below are some of the movement qualities and symbolic significances associated with the elements:

- EARTH — slow-moving; protective, warm, life-giving; dry, hot and life-taking; Mother Earth.

Earth — the Giver — Plant life growing

The Protector

- AIR — light, fast moving; whimsical, vast, intangible, etc.

Air — trapped, rising, expanding and escaping

The wind blowing the trees

- FIRE — hot, destructive; energetic, leaping, flickering; purifying; uncontrollable, etc.

*Fire — sweeping through the bush*

- WATER — fast flowing, trickling; purifying; soothing; dissolving, evaporating, freezing; life-giving, etc.

*Water — gently flowing . . . rippling and cascading*

### ASPECT 8 — The seasons

The variations within each season and the contrast of one season against another provide many ideas for movement. The division of the seasons depends very much on where you live and from where you come. For example, the people of English and European origin are aware of and can usually still distinguish four seasons. Asians may observe two — a wet and a dry season, and some aboriginals have six seasons. Shop windows and magazines display spring, summer, autumn and winter goods and many festivities are related to the traditional European concept of the four seasons. The following are examples of how the seasons could provide stimuli for Dance:

- SPRING — Rebirth, growth, youthfulness, gaiety, anticipation and activity.

  **Colours** often associated with this season, symbolically or realistically, are green (young shoots), pink (gaiety), white (purity), yellow (sun, wild flowers).

- SUMMER — Languidity, shimmering heat, drought, bushfires, holidays, swimming.

  **Colours** — gold (sand, sun), red (fires), black (burnt trees, charred landscapes), blue (skies and ocean), brown (bare earth).

- AUTUMN — Fruition, harvest, slowing down.

  **Colours** — brown (leaves dying, nuts), gold (wheat, maize), red (dying heat, fires, burning off).

- WINTER — Cold, desolation, hibernation, death, snow, rain, piercing winds.

  **Colours** — black (death), grey (desolation, melancholy), white (snow).

### ASPECT 9 — Man

Many abstract, lyrical, dramatic and humorous movement experiences can be developed from this ASPECT. A few ideas are set out below:

- the rhythms found *within* man — heart-beat, breathing, biorhythms, etc.
- rhythms related to basic human movements such as walking, running, hopping, leaping, etc.
- combinations of gesture and stepping
- whole body movements, like curling and stretching, rising and sinking, twisting and turning, etc.
- occupational rhythms — i.e. rhythms created through working actions such as sweeping, washing, typing, digging, pressing buttons and pulling levers, etc.
- the evolution of man from apes; the first mammals, etc
- the build-up or breakdown of relationships between people, mateship, love and marriage, group and organisations (forming, changing, developing) etc., friendship, families etc.
- using movement as a means of communication with people who may be deaf or speak a foreign language.
- relationships to animals — e.g. to dog, horse, kangaroo
- relationships to plants — e.g. medicine, perfume, timber, shade

### ASPECT 10 — The Cosmos

This can be a very exciting ASPECT for all age groups and for all types of movement experiences:

- the sun — the source of life on this planet — giving heat, light and other forms of energy
- sun-worshipping dances and dances based on the shape and pathway of the sun — circling, spinning, radiating
- the personification of the sun — Zeus, Sun-Kings, Omnipotence
- the Zodiac Sun signs and their personalities and characteristics
- the moon — softer and more gentle and less powerful than the sun
- the waxing and waning of the moon; full moon and crescent moon giving rise to changing formations and directions of movements
- the Man-in-the-Moon; lunacy; the romantic, magical moon; witchcraft and sorcery; the harvest moon; the feminine aspect of the moon as opposed to the masculine aspect of the sun
- the relationship of earth, sun and moon, as they rotate; eclipses, sun-spots, magnetic forces, radiations, auroras, rainbows, shadows and mirages
- the planets — Mars, war-like and fiery; Mercury — light and swift; Jupiter — powerful and jolly; Saturn — sad and cold

101

- stars — bright, twinkling, dancing, shooting
- Pulsars — a sudden flash of brilliance — and then nothing
- the Milky Way — soft, vast, dreamlike
- space itself — trying to interpret Einstein's statement: 'Space is an attribute of matter' into a dance could be very exciting, thought-provoking and even humorous!
- Einstein's theory of $E = Mc^2$ likewise could stimulate very interesting dances. Warped space, endless space, black holes, distortion of shapes as we travel beyond the speed of light. The change in colour and pitch as high speed objects approach us and leave us; Time, Relativity, The Fourth Dimension
- space journeys, space rockets and machines, strange life forms and surfaces can fire the imagination of young and old alike.
- films like 'Star Wars', 'War of the Worlds', '2001 — A Space Odyssey', scientific magazines, visits to space tracking stations and physics laboratories, poems, science fiction books and electronic music all help to motivate movement associated with this ASPECT.

Movement experiences related to the Cosmos can heighten people's awareness of the immediate environment, encourage them to play out relationships with others in various situations and also see the part they play in the whole scheme of things.

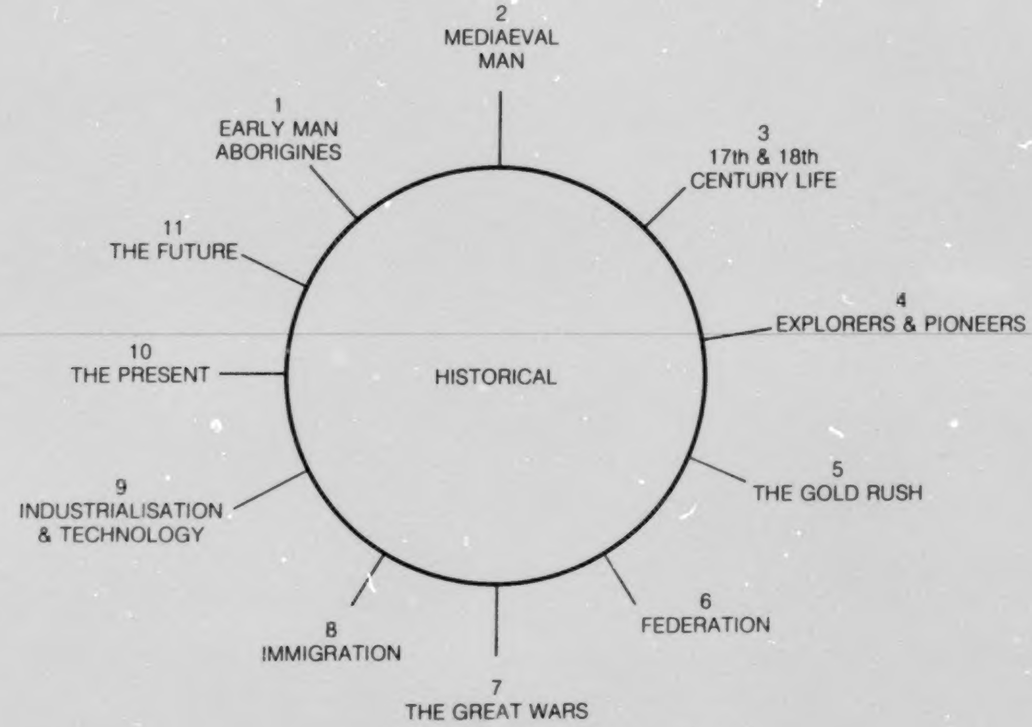
### ASPECT 11 — Creation

Below are a few ideas which could be explored and developed into dances or dramas with children of all ages:

- different theories on the beginnings of the Universe — e.g., The Big Bang theory, religious theories, the Dreamtime
- various stages of evolution could be isolated and treated as individual themes, e.g. — the emergence of life from the waters onto the land; the division of the land masses; Ice Ages
- a more general theme, like Harmony out of Chaos
- thought-provoking ideas on how the world might end — with a Whimper or a Bang

## AREA B — THE HISTORICAL

This AREA is very much people oriented and deals mainly with the way in which man has related to others and his environment throughout the ages. The following diagram shows ASPECTS which can be used as motivational means to explore the various movement possibilities:



102

## ASPECT 1 — Early man

Myths, legends, cave paintings, poems and films abound on the life of the Aborigines. Many beautiful dances and dramas can be created on this ASPECT by all age groups.

Kurt Sachs, in his book *World History of the Dance*, helps us to understand primitive man's attitude towards dance and the power of dance in his everyday life when he says: 'The thinking processes of primitive man do not include a comprehension of the natural relation of cause and effect. The natives imagine spirits and powers which influence life in mysterious ways, which bring about hunger and satiation, birth, sickness and death, which in turn can be influenced in magic activities that will attract them or drive them away. Man can work magic when dehumanised, transported, lifted by the divine out of the every day, torn out of the normal path of life, he walks into the void, into that expanse where the self mingles with the infinite'.

There are two main types of primitive dance:

1. *Image Dances*

   These are mimetic dances and much can be learnt about primitive man's daily life and activities from them.

   Under this heading are all sorts of dances related to animals.

   The actual animal movements, the hunt and the kill are all depicted in the dance.

   Other Image dances relate to fertility, initiation ceremonies, funerals and war.

2. *The Imageless Dances*

   These dances do not mimic the actions of everyday activities but are usually performed to enable the dancers to reach a state of ecstacy. They are related to the many gods of primitive man — to the god of rain, health, victory, fertility and war, etc. They are usually performed in a circle with the 'god' or some object representing it in the middle. A tremendous understanding of the Aborigines — their cultures, daily activities and beliefs — can be achieved through dances and dance dramas related to this ASPECT.

## ASPECT 2 — Mediaeval man

This ASPECT covers a large time span in which many dances from many different countries could be studied. Many however reflect society's beliefs, work and relationships with the environment.

- The Maypole Dance, which is still performed today is related to primitive man's fertility dances and the Morris Dance has its origins in early Moorish dance.
- Pre-occupation with death because of the plagues in this era created many dances on this theme. Children of all ages enjoy a dramatic dance situation on such themes as The Pied Piper of Hamelin and Danse Macabre.
- The influence of the church created and firmly established Choral Dances and processional dances to religious chants.
- The Guilds created their own dances which related to their various trades and skills; for example, the Shoemaker's Dance and the Swedish Weaving Dance. Children today enjoy creating their own 'trade' dances relating to harvesting, the crushing of the grapes, spinning the flax, etc.
- Wandering minstrels, jugglers and acrobats are yet other entertaining forms of movement.

## ASPECT 3 — The 17th and 18th centuries

Towards the end of the Middle Ages a common form of dancing among a community began to split. In primitive societies everyone joined in the dance, but by the 17th and 18th centuries there appeared a dance form for the peasants and another one for the upper class.

Clothes influence the movements of the wearer and the more civilised man became the less contact he had with his immediate environment. Fine clothes, as well as restricting movement, were not to be soiled in the streets or fields, and so the refined court dances evolved. Galliards, courantes, branles, pavane and minuets were typical court dances. Children enjoy — as a means of contrast and a moment to be a part of something very grand — performing these precise and sedate dances.

## ASPECT 4 — Explorers and Pioneers

Social studies lessons, visits to museums, films, books and journals provide a rich source of information on Australia's early explorers and pioneers.

- Pure dramatic situations depicting the journey made and the experiences encountered; reaction to the strange and unique flora and fauna; the climate; the Aborigines; the vastness of the continent; the loneliness, etc. can be developed.
- So to, can lyrical and abstract dances related to the thoughts, emotions and conflicts of these early adventurers.
- To observe or travel along a street or highway named after Hume, Sturt,

Leichhardt, etc., can stimulate the mind to think of the difference in the landscape and the contrast in travel between the 19th and 20th centuries. The student can then muse on what man has done to and for his environment.

### ASPECT 5 — The Gold Rush

### ASPECT 6 — Federation

### ASPECT 7 — The Great Wars

### ASPECT 8 — Immigration

### ASPECT 9 — Industrialisation and Technology

These ASPECTS deal mainly with milestones in the settlement, colonisation, growth and development of Australia. All can be approached in similar ways, be on-going, or be isolated to create dance and dramatic situations.

Occupational rhythms based on the work of the miners in the gold fields; music halls and can-can girls, and simple folk dances to bush bands can be related to ASPECT 5.

Mad capers and sad conflicts could be two themes for ASPECT 6.

The contrast of the two wars; the zany 20s; the Depression; marching, hunger, death, destruction, the leaving behind and the homecoming; the Charleston, Black-bottom Jazz and the Jitterbug can all be a part of ASPECT 7.

ASPECT 8 offers a wealth of Ethnic Dances and through these dances an awareness of the country and the customs the immigrants left behind them. Tsamikos, Kolo, Mazurka, Tarantella, Flamenco, Clog, Cossack and Tyrolean dances are but a few which could be taught.

Dances and Dramas based on themes of Exodus, Populate or Perish and the Yellow Peril could all help to make students more aware of each other's differences and also make them realise the changes made in and the effects upon the environment by an increasing population — the plants introduced and grown, foods eaten, clothes worn, style of houses built and different religions, are but a few.

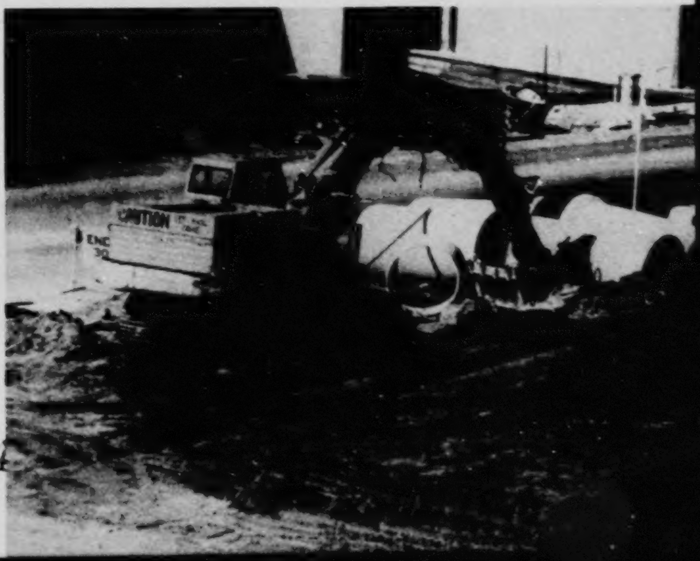
### ASPECT 9 — Industralisation and Technology

This can be seen in many different ways.

- Children of all ages enjoy being a typewriter, a train, a fork-lift truck, a bulldozer, etc.
- Visits to building sites, docks, factories, railway stations and freeways not only help as a stimulus for movement themes but make the children very aware of the human and animal qualities found in many machines. For example, comparisons leading to very interesting dance themes can be made between a seagull and the Concorde; a mosquito and a helicopter; a caterpillar and an earth-moving machine of the same name; insects and other excavational machinery; a submarine and a whale; bats and radar; humans and robots. Other movement ideas could be motivated by considering such thoughts as Nature — Man's Inspiration; Man v. Nature; Who's using Who.

*The dragonfly, like the mosquito, man's inspiration for the helicopter*

*An earth-moving vehicle, the mechanics of which were inspired by insects and the caterpillar in particular*



### ASPECT 10 — The present

Although ASPECT 10 is headed the Present, the 1950s and 1960s could be included. The dances and music of these years reflect man's social attitudes. The couples and social dances of the earlier decades gave way to individual dances such as the Twist, Hitch-Hike, Bus Stop, etc. Girls no longer had to be wallflowers; boys no longer had to suffer the humiliation of a refusal. Everyone could dance again! It didn't really matter if you didn't know the step or routine — you could make up your own. This casualness on the dance floor reflected a more casual lifestyle, but although man gained a freedom in dancing, he lost some contact and communication with others. The loudness and the hypnotic tempo of today's disco music can send modern man into a trance, a void, meditation or oblivion, depending on his need for dance. He can become oblivious to all the stimuli around him, or he can become more acutely aware.

Dances and dramas based on disco music and dance can help to make students feel they belong, that there is a common bond between them and that dance can be exhilarating. It can also make them feel very lonely and isolated because the music is too loud for them to speak to each other above it and the dances are individually performed. But in this era of modern technology 'we have to close the distance between the push-button order and the human act. We have to touch people' (Bronowski, 1973).

### ASPECT 11 — The Future

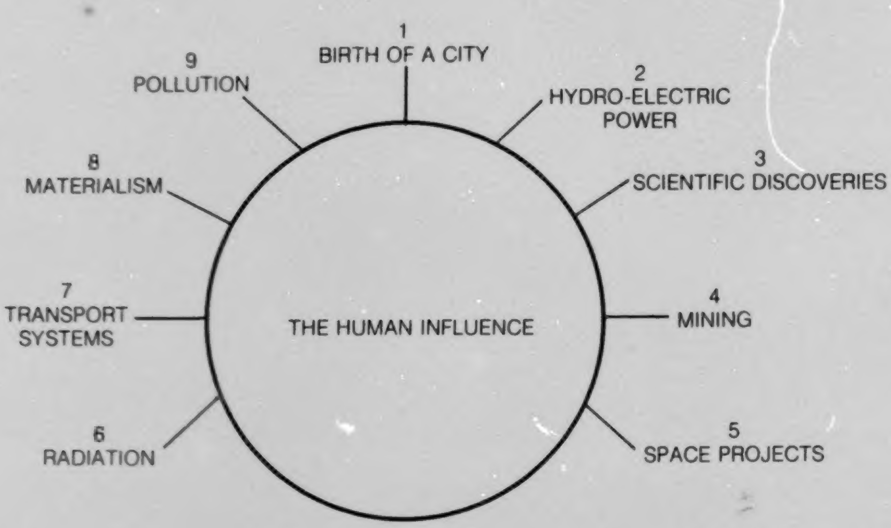
By looking back, by seeing what is, students can be encouraged to create dances and dramas on futuristic themes. These can be serious, horrific, fanciful or humorous and perhaps all approaches should be tried. To emphasise the relationship between movement and the environment, themes on Conservation, Transport and Fuel, Population, Space Technology, Energy Sources, Comparative Religions, Possible Evolution, Mutations, If I Rule the World, Over the Rainbow, If Pigs had Wings, City Under the Sea, In the Beginning, Again, etc. could all be used.

## AREA C — THE HUMAN INFLUENCE

'Man is a singular creature. He has a set of gifts which make him unique among the animals so that unlike them, he is not a figure in the landscape — he is a shaper of the landscape. In body and in mind he is the explorer of nature, the ubiquitous animal, who did not find but has made his home in every continent' (Bronowski, 1973).

Wherever man has been he has left his mark, whether it be 'Joe was 'ere 1962' scratched on a rock, or the building of the monumental Taj Mahal; a network of roads or a cluster of houses; a field of wheat or a power station. Man's effect upon the landscape is many sided. Depending on the viewpoint one could feel proud or disgusted, or both. It is important within this AREA that all view-points are considered and discussed, so that the students are able to form their own values and opinions. A light-hearted approach through movement to many of today's controversial issues can enable the students not only to become aware of these issues but also to formulate their own ideas.

Some ASPECTS related to this AREA are set out below



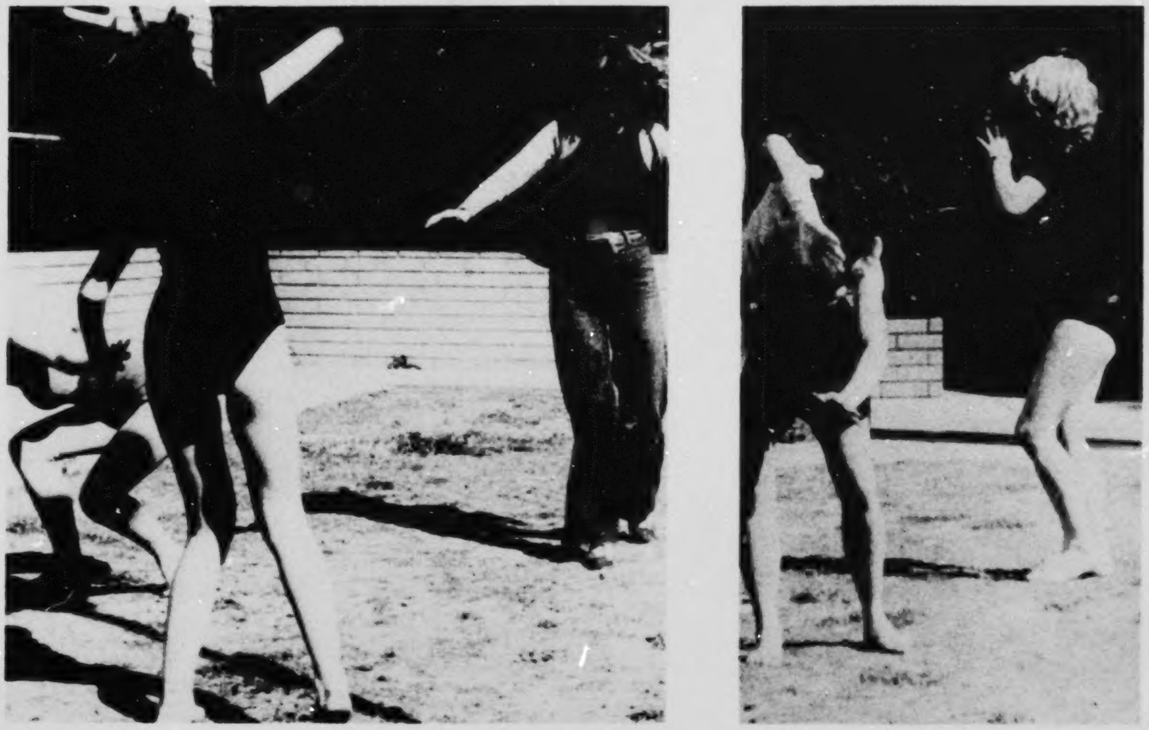
## ASPECT 1 — Birth of a City

Historical accounts, paintings, photographs, maps, visits to museums, industries and service depots could be the motivation for dances and dramas on this ASPECT.

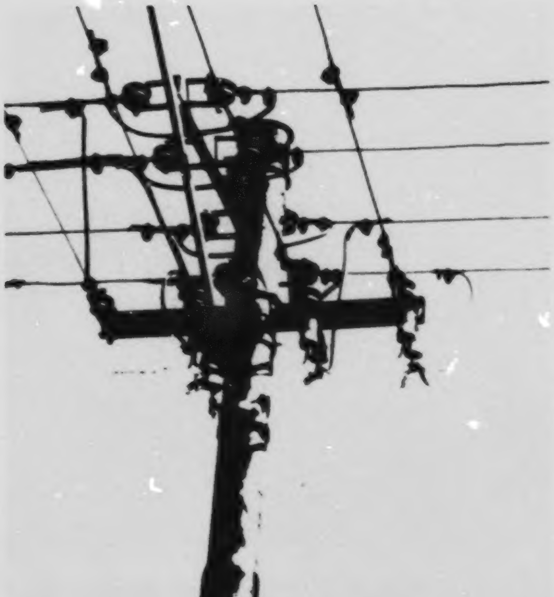
- Contrasts between cities could be made, for example, Adelaide, where Colonel Light stood on a hill and proclaimed the site of the city, and Canberra, a site already selected, then planned by an architect, Walter Burley Griffin.
- Many dramas and dances could be developed on the occupational rhythms of digging ditches, levelling the land, emptying wheelbarrows, erecting telegraph poles and laying railway sleepers.
- The actual building of houses, churches, offices and shops could stimulate interesting movement experiences based on the shape and angles of buildings and texture of the materials used.

*Touching a metal pole*

*Interpreting the tactile experience into movement*

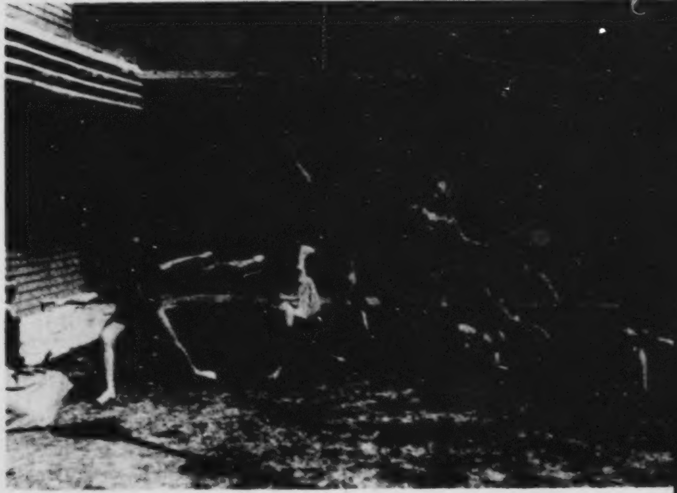


- Themes based on levels of movement and group shapes could also relate to buildings and such ideas as 'Look at Me, I'm Tall and Proud' and 'Look at Me, I'm Small and Intricate' and 'Now You see Me, Now You Don't' can all help to heighten the students' awareness of their surroundings.



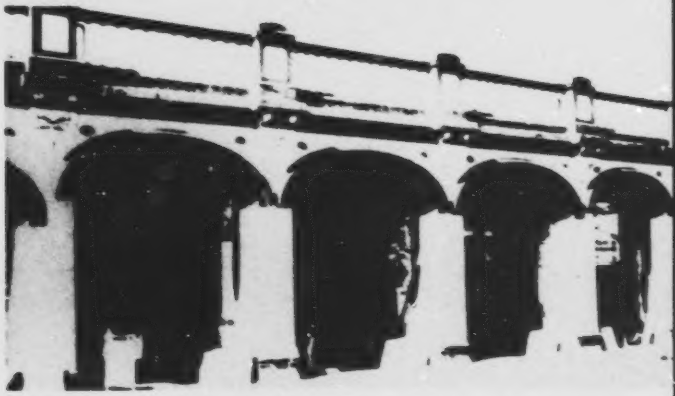
*The shape of buildings — as a stimulus for dances based on high and low levels, angular and curved body shapes and pathways*

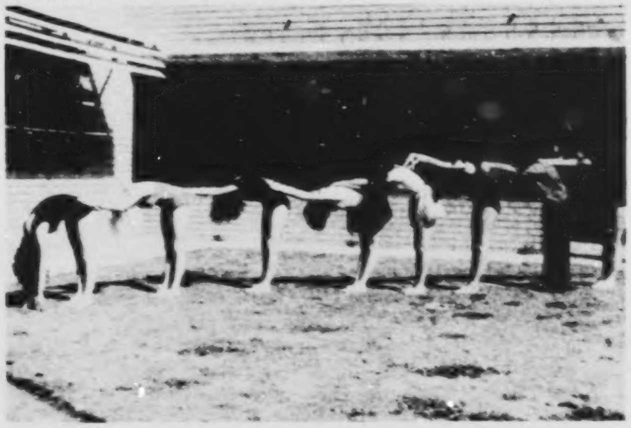
- Lyrical and repetitive dances can be created by becoming aware of the repetition often found in rows of terraced houses, fences, brickwork, arches and lines of telegraph poles.



*Telegraph pole — a stimulus for a group dance based on energy extending outwards*

Arches — a stimulus for movement based on curved body shapes and pathways



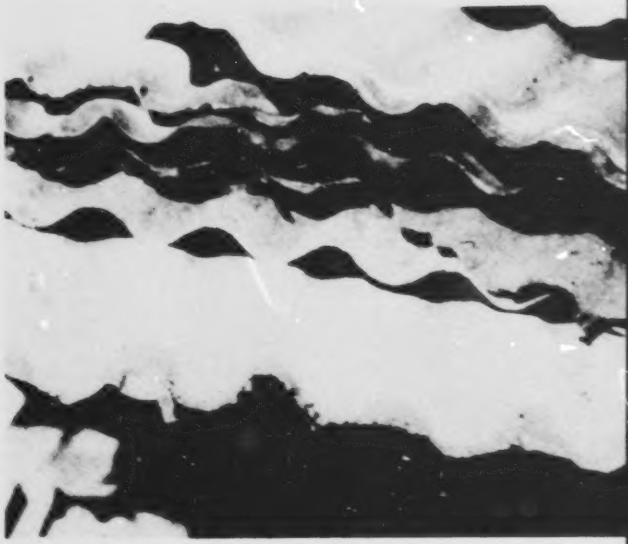


Being the bridge

Developing movement sequences based on the arch

## Buildings

Wrought iron. A stimulus for movement based on fine, delicate movements and intricate group shapes and pathways



Corrugated iron. Movement based on levels and curved body shapes and pathways

## Street scenes

*Chimney and roof tops — a stimulus for dances based on triangles, squares and rectangles*

*Telegraph poles — a stimulus for dances based on fine, delicate movements and direct pathways*

- Simple games and dances related to children's parks and playgrounds can be enjoyed especially if contrasted with the hustle of peak-hour travel and faltering steps of the elderly. Playing out these roles can often make the student very aware of the wide range of ages within a community and through understanding the movement patterns of various ages he can then react more sensitively towards others.

*Traffic signs — a group dance based on the community, sudden stop and start and changing directions*

- The restrictions that develop as a city grows can be treated humorously. Initially, people move casually, stopping to talk to each other, unhurried. Then the car arrives on the scene. People scuttle across roads and press themselves flat against walls. Then they buy a car and enjoy the exhilaration of speed, the screeching to a halt and the leaping off at the lights. And finally, as the pace quickens and more and more traffic lights and signs appear as if out of nowhere, in utter confusion and sheer exhaustion, everyone collapses.
- Another theme could be based on the physical growth of the city, again humour being the main element. The erection of more and more buildings within a limited area can cut out the natural light, create wind tunnels and restrict recreational space. Movement themes based on personal and general space could develop. People who could once dance and stretch out their limbs gradually find that whenever they do they touch something. Boxes and rostra representing buildings can gradually move in until the dancers representing the human element of the city feel crushed, flattened and elongated. The outcome could be a community effort to dig a hole, develop wings, knock down the buildings, or move away to start the whole thing over again.

### ASPECT 2 — Hydro-electric power

Movement themes related to this ASPECT could be:

- building of a dam. The arrest of flow and the changing of the course of a river, e.g. Jindabyne
- the flooded valley, 'Rescue Noah', e.g. The Ord River Scheme
- pipelines carrying water to different places; the effect of the water upon the once arid land
- the power derived from water — machinery, industry, etc.
- the recreational facilities provided by an artificial lake, e.g. Lake Pedder

### ASPECT 3 — Scientific discoveries

Over the centuries scientific discoveries have been many. I have chosen a few which could be easily transposed into movement themes for various age groups:

- the wheel — life before, reaction at the moment of discovery, life afterwards. Pure dances could also be developed on themes of rolling, turning, spinning, circling
- the telescope: This topic could create amusing dances and dramas based on themes of Big and Small, Near and Far
- gravity: again, humorous movement experiences could be developed — things dropping, people falling; Time, Weight and Space themes and personifying the various conditions of Gravity — serious, light-hearted, the absolute fool
- the invention of the radio — sound waves, long, short and medium, lead to interesting dance ideas
- transplants — the life-saving aspect and also ideas on the ultimate outcome of transplanted organs, etc. could both be developed
- the Archimedian Screw and the Theory of Buoyancy
- Watt's Steam Engine — vaporisation; pistons and cog wheels
- the Splitting of the Atom

So many of the things around us are taken for granted so, to encourage children to experience through movement what life for man was like before some of these inventions and for them to realise the effect these inventions have on their own life now, and might have in the future, awaken their awareness of man's achievements.

### ASPECT 4 — Mining

An interesting topic which can be approached in many different ways. A few ideas are below:

- comparisons can be made between the life of miners under the ground and those of burrowing insects, reptiles and mammals
- precious metals being turned into exquisite works of art
- the mining and refining of ores into metals for bridges, buildings, aeroplanes, etc.
- the defacing of the landscape
- the disregard of native sacrificial grounds, natural forests, etc.
- the ghost towns left when the raw materials are exhausted
- the new use of old mining sites — recreation grounds and man-made nature strips, often in the heart of an industrial scene

### ASPECT 5 — Space projects

A fascinating ASPECT with great appeal to students of all ages. With the added stimuli of film and electronic music, some exciting dances and dramas can be created:

- the movement of rockets and space ships
- life in a space capsule
- collisions in space
- satellites and the effect upon worldwide communications
- man's next home

**ASPECT 6 — Radiation**

This ASPECT is probably best dealt with by older students. However, some quite simple dances can be created relating to colour, pitch and varying intensity of rays:

- X-rays — healing, early detection of illness and disease
- Ultra-violet and Infra-red
- the breakdown of the ionisphere

**ASPECT 7 — Transport system**

Many movement themes come to mind on this ASPECT. A few that have proved successful with students are set out below:

- the movement qualities related to all forms of transport — boats (sailing, steam and motor powered), trains, trolleys and buses, aeroplanes, cars, motor-bikes and cycles
- the pathways and actions of such vehicles — planes soaring upwards, trains chugging along, trolleys surging and swaying, etc.
- meeting and parting of people at transport stations
- the possibilities and experiences of travel made available by transport

**ASPECT 8 — Materialism**

Under this ASPECT come topics such as Commercialism, Competition, Aggression, Greed, Health, Leisure and Comfort, etc.

All kinds of movement experiences can be developed on such themes and all help students to analyse their own emotions and motives and how what they are affects those around them.

- Dance and dramas based on poverty, the delight on receiving a gift, the anguish of giving when you feel you have nothing material to give
- Man's need to embellish his home
- the pressure and ultimate outcomes of keeping up with the Joneses
- various ideas and experiences related to the student's ideas on comfort
- a better standard of living
- boredom — 'I've been everywhere, man' 'I've got every gadget', etc.
- 'Anything you can do, I can do better'

A humorous approach to all of these topics creates a situation where no values or judgements are placed upon the child. Students enter into the situation as a movement experience but afterwards or during it can think upon the topic and formulate their own opinions.

**ASPECT 9 — Pollution**

A serious ASPECT, but with the added ingredient of humour it can be a favourite with many students of all ages.

Many contrasting movement experiences could be developed from such a theme as:

- The Purity of Air — bright sunlight, birds flying, flowers dancing, children playing, old folk strolling and sitting in the park. Then a change of scene — with factory chimneys belching smoke, cars roaring and screeching, transistors blaring out music, pneumatic drills jarring the body and jangling the nerves. Interesting resolutions will be created by the students themselves.
- A simple but poignant mime or drama could be created on a theme of Water Pollution. For example, a young boy fishing on the pier, hungry, and hoping to catch something to eat, but all he catches are old shoes, tin cans and plastic bags.
- Another idea, which could actually be performed in shopping centres, on the school oval or in parks, is based on the idea of litter. Using simple props, the children could dress as garbage bags and dustbins. Some could indicate that they are full and satisfied, others empty and lonely listen enviously to the more 'affluent' bins talk about all their possessions. Others are cursing and moaning because every time they become full some dog or cat creeps up and, not only steals what they have, but also suffers them the humiliation of being knocked over. Other bins complain of being placed too high up, too low down, or in a dark corner, or too close to a more brightly painted bin, etc.

Many ideas could be developed and any number of students could be involved.

**CONCLUSION**

Not every child can read or write or be clever in mathematics and science, make the school team or throw a pot on the wheel. But every child can move: children are born out of movement, they move from the moment of birth and never stop until the moment of death. Their emotions are released through movement as they stamp their feet in rage, hang their head in shame, quiver with fear and excitement and jump for joy. Through movement, where the mind and body work as one, they can reach out in all directions. The rhythm of life is within them and around them, and like primitive man through dance they can become closer to their environment and feel the bond which makes them a part of it. As educators we have a commitment to enable the child to develop intellectually, socially, emotionally and physically — and what better way of doing so than through Dance.

## ACKNOWLEDGEMENTS

Many thanks to Darrel Wyborn, Photography Department at Girrawheen Senior High School, for assistance with photographic material and the Year 8 and 10 students of Girrawheen Senior High School who willingly braved the elements for my photographic needs.

## REFERENCES

Bronowski, J. (1973), *The Ascent of Man*, British Broadcasting Corporation.

Sachs, K. (1963), *World History of the Dance*, W. W. Norton & Co. Inc.

Further ideas and explanations of some Movement Themes can be found in:

Laban, Rudolf (1963), *Modern Educational Dance*, McDonald & Evans.

Redforn, Betty, *Introducing the Lagan Art of Movement*, McDonald & Evans.

Russell, Joan (1958), *Modern Dance in Education.*

Russell, Joan, *Creative Dance in the Primary School.*

Russell, Joan (1963), *Creative Dance in the Secondary School*, McDonald & Evans.

Lofthouse, Peter, and Carroll, Jean, *Creative Dance for Boys*, McDonald & Evans.

Preston, Valerie (1963), *A Handbook for Modern Educational Dance*, McDonald & Evans.

Mettler, Barbara, *Materials of Dance as a Creative Art Activity*, Mettler Studios, Arizona, U.S.A.

Roberts, A., and Mountford, C.P. (1965), *The Dreamtime*, Rigby.

Baldwin, Francis, and Whitehead, Margaret (1972), *That Way and This*, Poetry for Creative Dance, Chatto & Windus.

Woodland, E.J.M. (1966), *Poems for Movement — A Teachers' Anthology*, Evans Bros Ltd.

Dawe, Bruce (1974), *Dimensions*, McGraw-Hill.

## MUSIC FOUND USEFUL AS A STIMULUS FOR DANCE

*Variations* (Andrew Lloyd Webber, M.C.A. Records)

*The Rites of Spring* (Stravinsky, Phillips)

*Theme Music from 2001 — A Space Odyssey* (Polydor Recordings)

*Flute de Pan et Orgue, Vol. 2* (Gheorghe Zamfir & Marcel Cellier, Festival Records)

*The World of Mahler* (The World of the Great Classics, Decca)

*Wish You Were Here* (Pink Floyd Music Ltd)

*Meddle* (Pink Floyd, E.M.I. Records)

*Oxygene* (Jean-Michel Jarre)

*Concierto de Aranjuez* (Rodrigo, Deutsche Grammophon)

*Australia and all that Jazz* (Don Burrows Quartet, Cherry Pie Records)

*Clouds Now and Then* (Richard Meale, Australian Festival of Music Vol. 4, Festival Records)

*Red Landscape* (P. Sculthorpe, Austral String Quartet, E.M.I.)

*Concerto for Flute and Harp* (Mozart, Deutsche Grammophon)

*Play Bach* (Jacques Loussier, London Globe Records)

*Music for Creative Dance* (Kiwi Records)

*Festival Folk Dances* (R.C.A.)

*Moon Flower* (Santana, C.B.S. Recording)

# *USING SIMULATIONS AND GAMES IN THE CLASSROOM*

*From R. Herschell, J. Hodgkinson, and J. Fein,*
*Resources Review, Department of Education, Queensland, 1980*

---

## WHAT ARE THEY?

In the world of international air travel, it would be very dangerous for any airline to attempt to train pilots on regular commercial flights. It is, however, extremely important that all pilots gain regular experience of the many types of conditions they are likely to face when transporting passengers across the world.

The problem of how best to provide 'risk-free' training for pilots has been overcome by the development of flight simulators — replicas of aircraft cockpits including every gauge, switch, control and lever. Flight simulators are connected to a wide range of electronic and audio-visual gadgetry which enables the pilot to be subjected to a great variety of meteorological and flight conditions with the accompanying scenes and sounds.

Each training pilot's procedures and reactions are carefully monitored and, if mistakes are made, he is able to learn from them at no risk to life or aircraft.

During recent years, the use of simulation techniques in education has increased at a prodigious rate. Activities such as *Lynwood, Portsville* and *Island* have quickly gained a wide degree of acceptance, while other activities have proved to be difficult to operate in the classroom.

At present, confusion exists among some teachers concerning the use of the terms 'simulation' and 'gaming' in an educational context. Some teachers fail to discriminate between simulation and gaming. Others regard gaming as an aspect of simulation. A third group see simulation as part of the technique of gaming. If simulations and games are to be used successfully in school programs, teachers need to appreciate not only the meanings of both terms but also their specific characteristics. In this way, they will be able to select the most appropriate activity for the teaching/learning objectives of each section or unit of work being developed. The following definitions have been designed to assist teachers to clarify the meaning of the terms simulation and game.

- *A simulation* accurately reflects some part(s) of reality. Therefore when students are involved in a simulation, they are manipulating a model or playing roles which assist them to develop an understanding of, and a feeling for, the reality being presented.
- *An educational game* on the other hand, is an activity in which players use data and/or skills, usually in a competitive situation. Games therefore are useful for presenting repetitive learning in novel ways. The situation in which the information and skills are used may not accurately reflect some aspect(s) of reality.

For example, *Squatter* is a game because it uses specific data and knowledge in an unreal way. This results from the nature of the rules of the game and the unreal role that chance plays in the activity. *Monopoly* would also be classified as a game under these criteria. However, when students become involved with investigating, for example, a controversial environmental issue and attempt to resolve it by playing the parts of identifiable community groups, these students are being involved in a simulation. Games tend to go no further than the use of specific knowledge and skills.

Often the ways that the terms simulation and game are used in school textbooks, reference books and other published materials do not follow from definitions such as those outlined above. It is important, therefore, that teachers examine each activity to determine whether it is a simulation or a game. This will assist in matching appropriate

113

learning activities with the objectives of the teaching/learning unit of work being developed.

Some commercially-available activities are difficult to categorise as either simulations or games.

## A SIMULATION OR A GAME?

Many teachers, aware of the need to use a wide range of teaching/learning strategies, are now using simulations and games as well as the more traditional methods of geographical inquiry and investigation. Each teaching/learning strategy has a role to play in the total learning sequence, as each strategy assists students to develop concepts, skills, attitudes and insights, as well as a body of knowledge. The various learning activities and experiences selected for use in particular sequences must become integral parts of all lessons, topics and units of work.

Simulation and gaming activities are most effective when student involvement in them has been developed to a high degree. Teachers who have not previously used simulations and games may be advised to begin by selecting simple activities for use with their students.

Teachers have found that by working, first of all, with simulations and games which do not involve an extended time commitment, they are able to develop skills in the utilisation of such activities. By gradually inducting themselves to the use of simulations and games, teachers avoid being overcome by the wide range of forms, rules, charts, tables, maps and other materials found in some of the more advanced activities. As a result, students become involved in a viable learning experience rather than simply playing a game.

Simulation and gaming activities often generate an enthusiasm for and/or a commitment to learning in general, a particular subject area, and an individual teacher. A good simulation or game creates a flexible, responsive learning environment the structure of which is supportive without being rigid and is able to take considerable modification without losing its efficiency. Many commercially-available activities are based on sound geographical principles, and teachers should consider their introduction and use in fulfilling the aims and objectives of teaching/learning programs.

In all *simulations*, as much emphasis must be given to the development of skills, concepts, attitudes, and values as to the acquisition of a body of knowledge. Syllabuses in Queensland contain a low level of specification of content. This allows teachers and students to work co-operatively in using a body of content, selected within certain guidelines, to develop more than just the simple recall of information. Students are able to learn through the use of content.

*Games*, however, are most useful when they involve students in repetitive learning presented in novel ways. Consequently the emphasis of games is not on the development of concepts and attitudes but on the acquisition of a body of specific knowledge and the utilisation of a range of processes and skills.

Before introducing a simulation or a game to students, teachers should make their own evaluation of each activity. The questions below have been designed to assist teachers in assessing the value of particular simulations and games:

- Do the objectives of the activity conform to the objectives of the section of the course being studied?
- Is the activity appropriate for the students?
- Is the activity interesting?
- Is the activity workable in a classroom situation?
- Does the activity have a sound knowledge base?
- What is the central problem presented in the activity?
- What are the choices available to the participants?
- What are the different moves or activities provided for the participants?
- What are the rules of the activity?
- How is the activity to be organised in the classroom?
- What summary exercises conclude the activity?

Consideration should also be given to the most appropriate way of incorporating a simulation or game into a learning sequence. Some simulations and games are most suitable for use as introductory activities to particular units of work; others are more appropriate for use throughout an entire learning sequence. Still others can be used as generalising and concluding activities.

Each simulation or game should be used in such a way as to maximise student outcomes in the learning sequence being employed. Care should always be taken to use simulation and gaming activities alongside other learning experiences as a means of securing a balance in student involvement in learning.

## CONDUCTING SIMULATIONS

*General guidelines for the classroom management of simulation activities*

- Do not over-use simulations. Just as students may have become immune to the motivational benefit of over-used audio-visual presentations, they may reach the point of saying 'Oh no, not another simulation!'.
- Incorporate the simulation into the overall structure of learning unit.
- Do not emphasise winning. Encourage students to see their achievements within the context of the satisfier-optimiser continuum, i.e. there are degrees of winning.
- Avoid individual student activity, wherever possible. Group work will minimise individual disappointments, foster group decision-making, interaction and team activity.
- Before commencing the activity: ensure that the students have had adequate experience with reality to appreciate the activity as a simulation; ensure that students see the activity as part of an integrated unit; discuss the purpose of the simulation — itemise learning objectives to form an evaluation checklist; and keep all rules and directions to a minimum, especially at the start of an activity.

Each of the above suggestions will focus the attention of students on the educational dimensions of the simulation.

During the activity, accept a reasonable level of noise and movement as valuable. Move around the room, help the students to become fully involved in the processes of the simulation. This can be particularly valuable because it helps teachers to assess the extent to which students understand the issues and processes involved.

In your interaction with the groups, question students about the strategies and decision-making processes being used, and the relationship of their activities, suggestions and decisions to reality.

After the simulation has been completed, hold an evaluation session. Refocus attention on differences between the simulation and reality. Allow students to review their achievements in light of the objectives itemised. Use a checklist. Repeat the simulation with a view to improving student understanding, and redesigning the activity.

Since simulations can best assist in the development of skills, concepts and attitudes, it is these areas which should be the subjects of evaluation for assessment purposes, not the knowledge of the area of content which the students may have used. Evaluation instruments could include essay questions on the real-world situation of which the simulation activity is a model; attitudinal scales; essay questions on the processes involved in the simulation, for example, how decisions are made concerning the resolution of an environmental issue; practical exercises to measure the extent to which skills were developed by the simulation; and practical exercises to validate the concepts developed by the activity.

## CONDUCTING GAMES

Although many of the general guidelines which apply to the classroom management of simulations also apply to the management of games, there are several important differences to consider, most of which are related to the differences between games and simulations already outlined:

- Games involve the use of factual information and skills rather than concentrating on conceptual and social developments.
- Winning often plays an important role in a game.
- In game activities, individual work may be more desirable than group work.
- After the activity, students do not become involved in a consideration of simulation-reality differences as they do with a simulation.
- The evaluation instruments used to assess the educational outcomes of games concentrate on facts and specific skills rather than on concepts and attitudes.

## USE OF GAMES AND SIMULATIONS — PITFALLS TO AVOID

To ensure that simulations and games are not discarded because of bad implementation, it is important that teachers should become familiar not only with the benefits, but also the possible pitfalls in the use of such activities in the classroom.

An important task for teachers to perform is basic 'public relations'. Fellow teachers, school administrators and parents should be encouraged to support you and your students in the use of educational simulations. They are most likely to do this if they fully understand what you are trying to do and why you are doing it.

Information concerning simulation and gaming activities can be disseminated through notices, a newsletter, a departmental policy booklet, or at a meeting. Once a favourable attitude of the staff to its objectives and strategies is created, the chance of parental or administrative opposition to simulation and gaming is reduced.

Another important point for consideration is the teacher's attitude to the presentation of the activity. If students become more interested in winning than learning, it may be because they are not perceiving the activity as part of an integrated learning unit. The reaction of students to the activity will parallel that of their teacher. Such activities must be integrated into the total learning unit.

Teachers should expect the simulation or game to acquaint their students with the broad outline of the issues, and to motivate them to become more deeply involved in pursuing these issues and in seeking solutions. Alternatively, a simulation may be the concluding activity of a program, bringing together and evaluating what has gone before. Other activities form integral parts of particular units of work by forming the core activity around which other experiences revolve.

# *ENVIRONMENTAL IMPACT STUDY*

*David J. Kopelke*

---

## PREAMBLE

*Environmental Impact Study* is a simulation exercise for fieldwork in environmental education. While based on an actual example, the location of an aluminium smelter on Boyne Island near Gladstone in Queensland, it attempts to provide a basic framework for the development of a similar simulation based around a pending development or a fictitious development in your local area. Its particular value therefore derives from its being an example for teaching methodology rather than as a case study.

---

## INTRODUCTION

*Environmental Impact Study* was developed primarily for secondary students visiting the Boyne Island Field Study Centre. It attempts to integrate activities in the classroom and field through a simulation format and has the following aims:

(i) to develop an understanding of the mechanism by which industrial development occurs;

(ii) to provide an opportunity for students to apply geographical field skills;

(iii) to develop an awareness of the environmental impact that industry has on an area;

(iv) to assist students to develop a realisation that the implications of industrial development on environment involves a wide spectrum of group and political activities;

(v) to assist students to develop and review attitude and values conducive to concern for the wise use of the environment;

(vi) to develop within students an awareness of the significance that school-learned skills play in the non-school world; and

(vii) to provide a vehicle by which classroom theory can be integrated with the practical experiences of field work.

Since it was designed for use at a field study centre, *Environmental Impact Study* differs in several important respects from the usual role playing simulation. The most significant difference is that students are expected, with guidance, to design their own research programs. Emphasis is placed on the collection, interpretation and presentation of primary data and the use of that data to plan a development program for the area of Boyne Island. The use of published material is minimal as it is intended to provide background information only.

The possibility of large scale industrial development in the form of an aluminium smelter on Boyne Island provided an obvious focus for the simulation. Staff at Gladstone High School, the local secondary school, expressed interest in participating and the program was developed in co-operation with the geography subject master. The school had extensive statistical information on the Gladstone area, Comalco provided literature on the aluminium industry, and teachers collected articles on the impact of industry on the environment. These materials formed the core of student study kits. The following description is based on the experiences of their first group of Year 12 students to undertake the simulation.

## THE LEARNING SEQUENCE

The whole unit took ten periods of class time and one and a half days of field work to complete. After an introductory lesson, a further five periods were spent with each group structuring its enquiry. During this time, research using books, films, maps and photographs was carried out. This meant that the one and a half days in the field could be used solely for field surveys and data collection. The remaining four periods were spent preparing group reports. It was also necessary for each group to meet at least once every day outside of class time to discuss various aspects of their work.

### Introductory Phase

To begin the exercise, the officer from the field study centre visited the school and explained the nature of the simulation, drawing particular attention to the fact that students must devise their research, collect, collate and interpret their field data, and present a report on their findings to a tribunal which would assess the merits of the case they put forward. Since the exercise had many parallels with the actual planning of an aluminium smelter on Boyne Island, it was necessary to stress that this was a simulation and that it departed from reality in several respects.

The class was then provided with background information about the mining, processing and use of aluminium through a range of audio-visual materials. The film *An Element of Change* (now renamed *The Aluminium Age*) was shown first. This provides an excellent overview of all stages of aluminium processing from mining to recycling. This overview was considered necessary in order to provide students with an understanding of the operations of a smelter as well as to provide a stimulus to initiating the exercise by establishing an atmosphere of purpose and realism. Further background was obtained from booklets produced by Comalco, in particular *Developing an Aluminium Industry* and *How Comalco Makes Aluminium*.

At the same time, the school approached the local council while members of the field study centre sought the support of Comalco and local residents to provide additional, locally-based information and to assist as resource people for groups during their field work session. This had the effect of increasing local awareness of the students' activities so that they had little difficulty in obtaining the assistance they sought.

### Allocation of Roles

To prevent the background information from being filtered by the roles groups were allocated, the role cards were not distributed until the preliminary research phase was completed.

**AUSTAL**

- A company wishing to build a smelter at Boyne Island.

- The board of directors consists of F.E. Iron, General Manager; Miss Single, Secretary; J. Kane, Works Manager; M. Birks, Environmental Officer; A. Murry, Process Controller; and their secretaries.

- This site is attractive because of many economic factors. Therefore you are concerned primarily with the potential economic benefits that may flow from construction. Despite Mr. Birks' concern for environmental implications, F.E. Iron regards economic growth as the prime consideration.

- Your group task is to develop a compelling case in favour of construction of a smelter on this site.

- You should also produce a plan of development of the smelter, associated facilities and urban growth.

**BOYNE ISLAND COUNTY COUNCIL**

- The local government body controlling the area proposed for smelter development.

- Councillor Rayfield, the chairman and Mr. Curran the County Clerk as well as the rest of the councillors are most anxious to have industrial growth in the county. However, they are concerned that the interests of existing rate payers be protected.

- Councillor Single, who represents the area where the smelter is to be located, is aware that her position on the council is depended on the voters attitudes to the smelter.

- You should plan the necessary services and facilities that will be needed to meet expectant population growths and industrial requirements.

- This development should be tempered with, the cost burden that may be placed on the Council and hence the rate payers.

**BOYNE ISLAND COMMUNITY DEVELOPMENT ASSOCIATION**

- A group composed of local residents whose chief concern is their community and their life style.

- This group was formed by Mr. Upton and Mr. Champion, both leading figures in the community. Both also have their eyes on a future career in politics.

- Before the Association can take a stand, it must ascertain the feelings of the local community about the impact such a large scale development will have upon the area.

- You want you life style protected as it was the casual atmosphere of Boyne Island that attracted you there. However the area is lacking in many facilities and you see the smelter as providing the opportunity of acquiring these services and facilities.

- Within the report you should therefore bring forward the character of Boyne Island and the way development, if any, should help maintain this character.

**ENVIRONMENTAL PROTECTION COUNCIL**

- A governmental advisory body, which has as its prime concern, the environmental Green Meadows.

- Although the council is a government body, the head Dr. Claypan, a biologist has noticed an increase in the number of young staff who have departed from his own traditional view of the council as a supportive service for industry. Most prominent amongst this new group of scientists who believe the council should play an educating role in the development of environmental awareness is Mr. Birditt.

- The council has also on its staff a number of technicions and field officers.

- The council should therefore plan, develop and carry out field studies of the Boyne Island environment to determine the impact that the smelter and associated development will have on the fauna, flora, tapography.

In a simulation of this type, a number of group roles could have been created but it was decided to restrict them to the four main sets of actors involved in the development of a smelter: the initiating company, the local government authority, the environmental research body, and local residents. This restriction also allowed the simulation to be more closely tailored to the Year 12 course pattern in the Queensland geography syllabus where students were studying one of the following semester units:

- Man and Environment
- Settlement Patterns and Processes
- Economic Geography

Each class group was allocated to roles that fitted in with their particular course of study so that students who were studying Economic Geography concentrated on relationships between industry and environment, while students who were studying Settlement Patterns and Processes concentrated on the evolution and change in settlements. Areas subject to deliberate transformation and conflicts in man-environment relationships were the foci for students in the Man and Environment course.

In their newly formed role groups, students discussed the parts they were to play. This was done by attempting to define the character that the group must adopt. The discussion that followed provided the basis for further work.

Two members of the school staff and the officer from the field study centre acted as advisers to the four groups, each of which had approximately ten members. During the field work phase an extra teacher was used as each group worked independently. Their advisory role was vital for they had to ensure, preferably by questioning and by generating ideas, that the group interpreted the 'correct' frame of enquiry from the role card. The advisers' role initially involved guiding students to develop an appropriate set of enquiries. This proved difficult as the role cards were, of necessity, somewhat open-ended. Advisers did, however, have a list of suggested activities (see Appendix I). Once the enquiries were structured, the advisers' role changed to that of resource people who directed students to sources of information and took them to various locations.

Decisions about the data to be collected and the best means of acquiring it were determined by students in conjunction with their adviser. Here, the role of adviser was important to ensure that procedures for data collection were expedited. The adviser had at his or her disposal a variety of sample worksheets that could provide ideas either in themselves or serve as guides for students to develop their own data collection sheets (see Appendix II). In addition, advisers had a copy of 'Guidelines for the E.I.S. Austal Smelter at Boyne Island' (Appendix III). If there was a close correlation between the students' worksheets and the sample worksheets, then use of the latter was encouraged. An alternative approach, after discussing what information was needed and how it was to be obtained, would be to distribute a booklet of teacher-prepared worksheets.

## Collection of the Data

On the day that the fieldwork was conducted, and after an initial briefing session, groups went their separate ways, each of them being accompanied by an adviser whose role was largely supervisory. The field officer rotated between groups to facilitate co-ordination and to provide additional advisory support.

The first field activity was conducted with the full class and involved a general tour of the study area. This served as a means of introducing students to the existing environments.

Students were also introduced to the resource people who had been contacted previously by the school. These resource personnel represented sectors of the community that corresponded with the role groups. The Austal role group, for example, met with a design engineer from an aluminium company, the Boyne Island County Council with a shire clerk, the Environmental Protection Council with a conservationist, and the Development Association met with leading local citizens. These people talked to their group about their organisational involvement in the proposed smelter, supporting their talks where appropriate by the maps and statistics that had been prepared for the real life situation. Although the resource people had a copy of the types of information students were seeking, much of the talk was guided by student questioning.

Each group then carried out the particular field activities that had been planned in the preparation sessions.

## Compilation of the Data

The compiling of the data and its interpretation occurred back in the school. The role cards were used to determine the relevance of the material that was collected. The role card also gave a general outline of the type of submission required for the tribunal hearing and this, combined with earlier discussions with the group adviser, determined the information that students required.

After completing the interpretation of their own data, some groups found that they needed to request further information from other groups. The Austal Company, for example, sought details on vegetation types from the Environmental Protection Council. Further research, using maps and reference books was also necessary in this data interpretation stage.

Groups then wrote a report which outlined their response to the proposed development as revealed by their observations. A variety of audio-visual material was included to support their positions.

### The Tribunal

On completion, reports were presented to a tribunal. This panel questioned groups at various times if clarification was necessary, but its main role was to provide a forum for reports being given, and to focus debate on the continuous issues and inconsistent statements of evidence. Each group was allowed twenty minutes to present its initial submission. This was followed by a period of questioning by the tribunal.

The tribunal's role was clearly stated in the guide to the field simulation. It was found that independent persons such as engineers, members of the clergy, a lecturer from a tertiary institution and the P & C Association president were well suited to the role. The tribunal handed down a decision that clearly reflected the evidence that was presented to it as well as making valuable critical comment on the quality of the argument presented.

Following the tribunal decision, an open forum was held where all present were able to comment on and freely discuss the arguments presented as well as the problems each group faced.

### Further Developments

At this stage role playing, as defined by role cards, ended. The groups now acted as a 'Planning Authority' to evaluate the information given in the various reports. This was an additional stage that has been added to the original simulation. It developed out of a need for students to have an opportunity to attempt to correlate all information from the different groups.

As a culmination of this evaluation process, the class planned an 'ideal' development of the area. This occurred as follow-up at home or during normal class time. This stage enabled the students to relate the information that they compiled to the totality of data collected. The students also developed an understanding of model building, as they attempted to build a model of industrial development.

The teacher finally discussed the results that were obtained and evaluated, with students, the original objectives and how these were achieved. During these final stages the centre officer and teachers played a minor role, leaving the majority of work to the students. Indeed it was only at the time of presentation of reports that centre staff were present.

## ACKNOWLEDGEMENTS

I wish to thank Bob Stevenson and Bob Herschell for their many helpful comments and support in finalising this description. I also wish to acknowledge Robin McAlpine who assisted in the formulation of the original program and has written segments of this description. A copy of the report compiled by Gladstone State High School students after carrying out the simulation was kindly provided by the school.

## APPENDIX I

### Suggested Activities

(An interpretation of the Guidelines for the Group Advisers)

The accompanying activities for individual groups were designed to assist the adviser in guiding the group and at no time should be regarded as the boundaries of study or the format to be adopted.

Students were expected to devise their own exercises.

The included series of exercise sheets could have been referred to if the group decided that a study of the type (written up) was necessary and sought help in how to go about such a study.

The examples were used on their own or as a guide if the group designed its own sheet.

**AUSTAL:**

| | | |
|---|---|---|
| Concepts | — site (location)<br>— process<br>— markets<br>— power<br>— workforce | — plant layout<br>— raw materials<br>— waste disposal<br>— transport<br>— infrastructure |
| Activities | — map and aerial photo interpretation<br>— discussion with local government/industry<br>— inspect sites and routes | |
| Report | — (concentrating on economic geography skills)<br>— process flow chart<br>— systems analysis of plant<br>— facilities provided | |

## ENVIRONMENTAL PROTECTION COUNCIL:

Concepts
- fauna/flora
- waste disposal
- residential development
- process
- scenic beauty spots
- recreation facilities

Activities
- investigation of local fauna and flora
- interview local government/conservationists

Report
- (concentrating on biogeographical skills)
- vegetation survey
- fauna counts
- impact on fauna/flora/topography

## BOYNE ISLAND COUNTY COUNCIL:

Concepts
- residential development
- land costs
- transport routes
- recreation facilities
- waste disposal
- scenic beauty spots

Activities
- visit proposed site
- talk by clerk/engineer
- discuss town plans costs

Report
- (concentrating on urban geographical concepts)
- proposed zoning
- industrial
- residential
- commercial
- transport
- recreational
- costing of infrastructure—
  - from company
  - from council

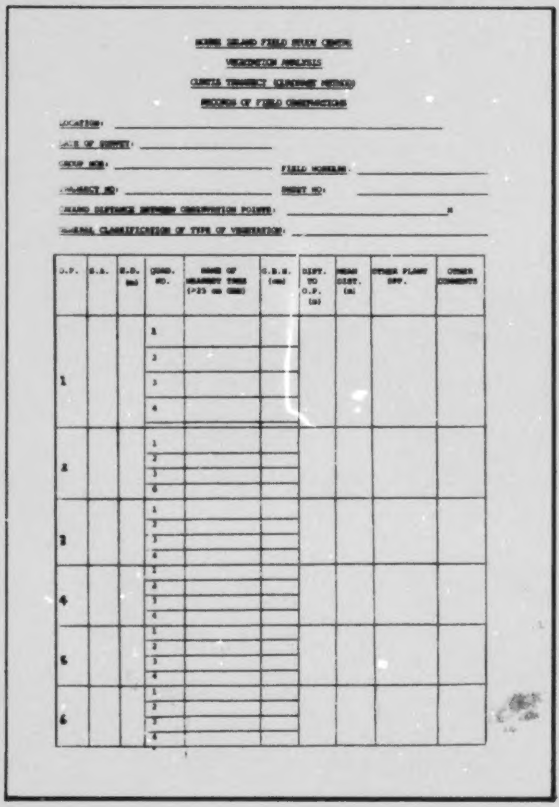
## BOYNE ISLAND COMMUNITY DEVELOPMENT ASSOCIATION:

Concepts
- social impact
- land costs
- facilities
- other development
- areas of development
- pollution

Activities
- questionnaire/interviews

Report
- (concentrating on human geographical concepts)
- social attitudes to—
  - industry
  - residential development
  - recreational activities
- statistical analysis of urban growth

# APPENDIX II SAMPLE WORKSHEETS



BOYNE ISLAND FIELD STUDY CENTRE

VEGETATION ANALYSIS

CURTIS TRANSECT (QUADRANT METHOD)

RECORDS OF FIELD OBSERVATIONS

LOCATION: ______________________

DATE OF SURVEY: ______________

GROUP NO: ______________ FIELD WORKERS: ______________

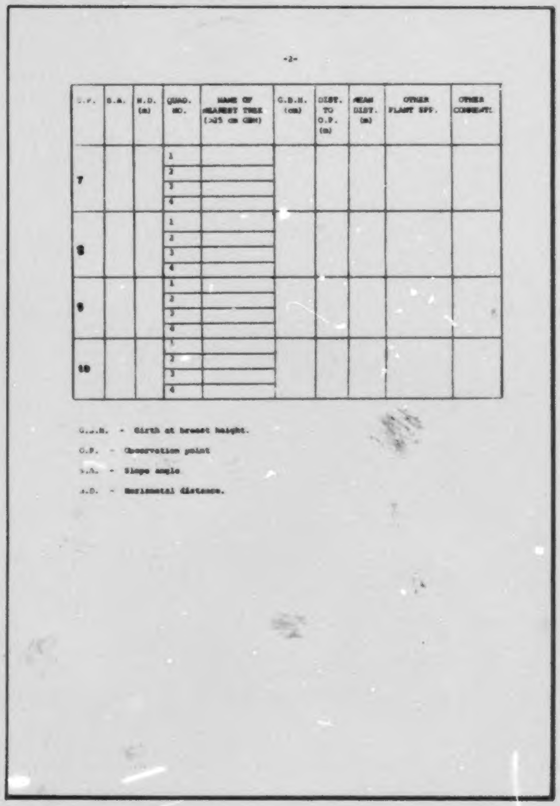
TRANSECT NO: ______________ SHEET NO: ______________

GROUND DISTANCE BETWEEN OBSERVATION POINTS: ______________m

GENERAL CLASSIFICATION OF TYPE OF VEGETATION: ______________

| O.P. | S.A. | H.D. (m) | QUAD. NO. | NAME OF NEAREST TREE (>25 cm GBH) | G.B.H. (cm) | DIST. TO O.P. (m) | MEAN DIST. (m) | OTHER PLANT SPP. | OTHER COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 2 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 3 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 4 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 5 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 6 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |

---



-2-

| O.P. | S.A. | H.D. (m) | QUAD. NO. | NAME OF NEAREST TREE (>25 cm GBH) | G.B.H. (cm) | DIST. TO O.P. (m) | MEAN DIST. (m) | OTHER PLANT SPP. | OTHER COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| 7 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 8 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 9 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 10 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |

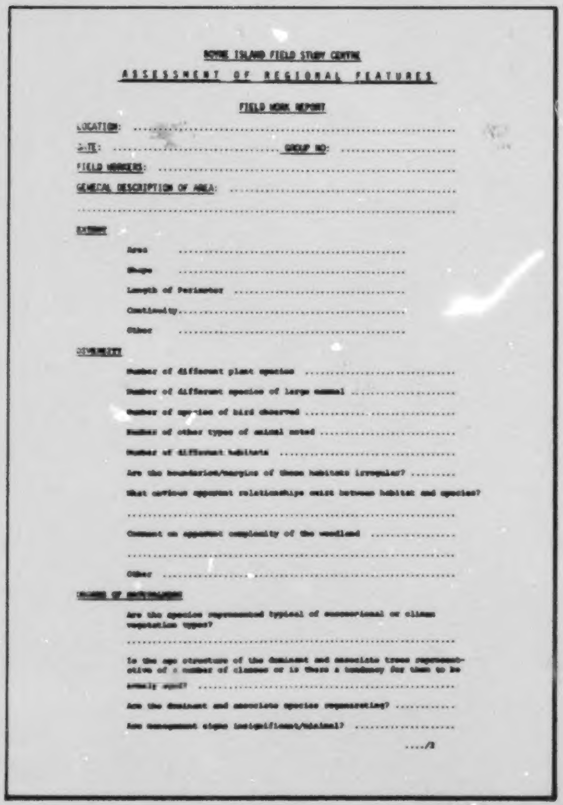
G.B.H. - Girth at breast height.

O.P. - Observation point

S.A. - Slope angle

H.D. - Horizontal distance.

---



BOYNE ISLAND FIELD STUDY CENTRE

ASSESSMENT OF REGIONAL FEATURES

FIELD WORK REPORT

LOCATION: ..........................................

DATE: .............................. GROUP NO: ....................

FIELD WORKERS: ..........................................

GENERAL DESCRIPTION OF AREA: ..........................................

..........................................

EXTENT

Area ..........................................

Shape ..........................................

Length of Perimeter ..........................................

Continuity..........................................

Other ..........................................

DIVERSITY

Number of different plant species ..........................................

Number of different species of large mammal ..........................................

Number of species of bird observed ..........................................

Number of other types of animal noted ..........................................

Number of different habitats ..........................................

Are the boundaries/margins of these habitats irregular? ..........

What obvious apparent relationships exist between habitat and species?

..........................................

Comment on apparent complexity of the woodland ..........................................

..........................................

Other ..........................................

DEGREE OF NATURALNESS

Are the species represented typical of successional or climax vegetation types?

..........................................

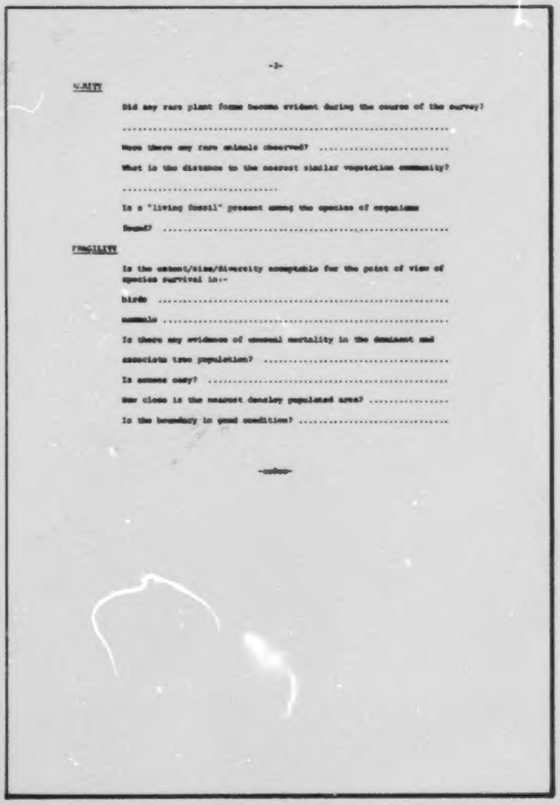
Is the age structure of the dominant and associate trees representative of a number of classes or is there a tendency for them to be evenly aged? ..........................................

Are the dominant and associate species regenerating? ..........................................

Are management signs insignificant/minimal? ..........................................

..../3

---



-3-

RARITY

Did any rare plant forms become evident during the course of the survey?

..........................................

Were there any rare animals observed? ..........................................

What is the distance to the nearest similar vegetation community?

..........................................

Is a "living fossil" present among the species of organisms found? ..........................................

FRAGILITY

Is the extent/size/diversity acceptable for the point of view of species survival in:-

birds ..........................................

mammals ..........................................

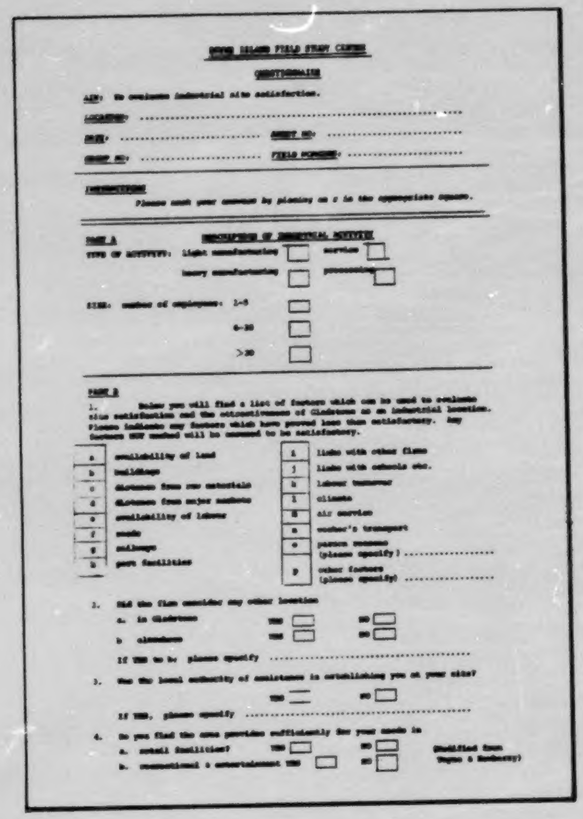
Is there any evidence of unusual mortality in the dominant and associate tree population? ..........................................

Is access easy? ..........................................

How close is the nearest densley populated area? ..........................................

Is the boundary in good condition? ..........................................

-oOo-



BOYNE ISLAND FIELD STUDY CENTRE

QUESTIONNAIRE

AIM: To evaluate industrial site satisfaction.

LOCATION: ........................................

DATE: .................... SHEET NO: ....................

GROUP NO: .................... FIELD WORKERS: ....................

INSTRUCTIONS

Please mark your answer by placing an x in the appropriate square.

PART A DESCRIPTION OF INDUSTRIAL ACTIVITY

TYPE OF ACTIVITY: light manufacturing ☐ service ☐

heavy manufacturing ☐ processing ☐

SIZE: number of employees: 1-5 ☐

6-30 ☐

>30 ☐

PART B

1. Below you will find a list of factors which can be used to evaluate site satisfaction and the attractiveness of Gladstone as an industrial location. Please indicate any factors which have proved less than satisfactory. Any factors NOT marked will be assumed to be satisfactory.

| | | | |
|---|---|---|---|
| a | availability of land | i | links with other firms |
| b | buildings | j | links with schools etc. |
| c | distance from raw materials | k | labour turnover |
| d | distance from major markets | l | climate |
| e | availability of labour | m | air service |
| f | roads | n | worker's transport |
| g | railways | o | [illegible]<br>(please specify) .................... |
| h | port facilities | p | other factors<br>(please specify) .................... |

2. Did the firm consider any other location

a. in Gladstone YES ☐ NO ☐

b elsewhere YES ☐ NO ☐

If YES to b: please specify ........................................

3. Was the local authority of assistance in establishing you at your site?

YES ___ NO ☐

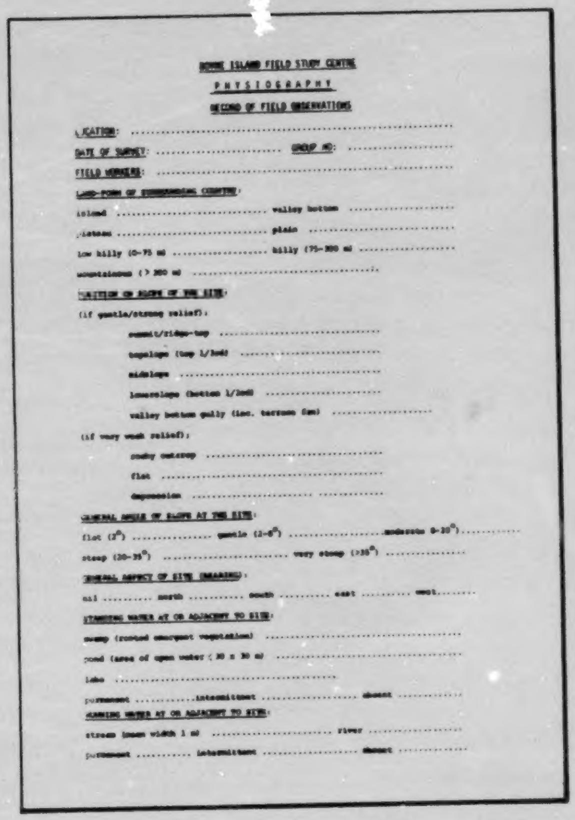
If YES, please specify ........................................

4. Do you find the area provides sufficiently for your needs in

a. retail facilities? YES ☐ NO ☐

b. recreational & entertainment YES ☐ NO ☐

(Modified from [illegible] & [illegible])



BOYNE ISLAND FIELD STUDY CENTRE

PHYSIOGRAPHY

RECORD OF FIELD OBSERVATIONS

LOCATION: ........................................

DATE OF SURVEY: .................... GROUP NO: ....................

FIELD WORKERS: ........................................

LAND-FORM OF SURROUNDING COUNTRY:

island .................... valley bottom ....................

plateau .................... plain ....................

low hilly (0-75 m) .................... hilly (75-300 m ....................

mountainous (> 300 m) ....................

POSITION ON SLOPE OF THE SITE:

(if gentle/strong relief):

summit/ridge-top ....................

topslope (top 1/3rd) ....................

midslope ....................

lowerslope (bottom 1/3rd) ....................

valley bottom gully (inc. terrace fm) ....................

(if very weak relief):

rocky outcrop ....................

flat ....................

depression ....................

GENERAL ANGLE OF SLOPE AT THE SITE:

flat (2°) .................... gentle (2-6°) .................... moderate 6-20°) ....................

steep (20-35°) .................... very steep (>35°) ....................

GENERAL ASPECT OF SITE (BEARING):

nil .......... north .......... south .......... east .......... west..........

STANDING WATER AT OR ADJACENT TO SITE:

swamp (rooted emergent vegetation) ....................

pond (area of open water < 30 x 30 m) ....................

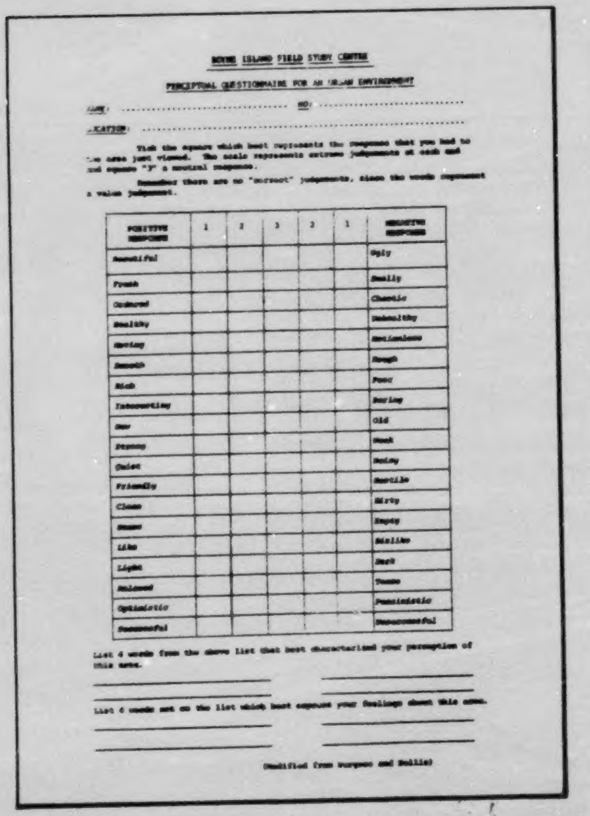
lake ....................

permanent .......... intermittent .......... absent ..........

RUNNING WATER AT OR ADJACENT TO SITE:

stream (mean width 1 m) .................... river ....................

permanent .......... intermittent .......... absent ..........



BOYNE ISLAND FIELD STUDY CENTRE

PERCEPTUAL QUESTIONNAIRE FOR AN URBAN ENVIRONMENT

NAME: .................... NO: ....................

LOCATION: ........................................

Tick the square which best represents the response that you had to the area just viewed. The scale represents extreme judgements at each end and square "3" a neutral response.

Remember there are no "correct" judgements, since the words represent a value judgement.

| POSITIVE RESPONSE | 1 | 2 | 3 | 2 | 1 | NEGATIVE RESPONSE |
|---|---|---|---|---|---|---|
| Beautiful | | | | | | Ugly |
| Fresh | | | | | | Smelly |
| Ordered | | | | | | Chaotic |
| Healthy | | | | | | Unhealthy |
| Moving | | | | | | Motionless |
| Smooth | | | | | | Rough |
| Rich | | | | | | Poor |
| Interesting | | | | | | Boring |
| New | | | | | | Old |
| Strong | | | | | | Weak |
| Quiet | | | | | | Noisy |
| Friendly | | | | | | Hostile |
| Clean | | | | | | Dirty |
| [illegible] | | | | | | Empty |
| Like | | | | | | Dislike |
| Light | | | | | | Dark |
| Relaxed | | | | | | Tense |
| Optimistic | | | | | | Pessimistic |
| Successful | | | | | | Unsuccessful |

List 4 words from the above list that best characterised your perception of this area.

____________________ ____________________

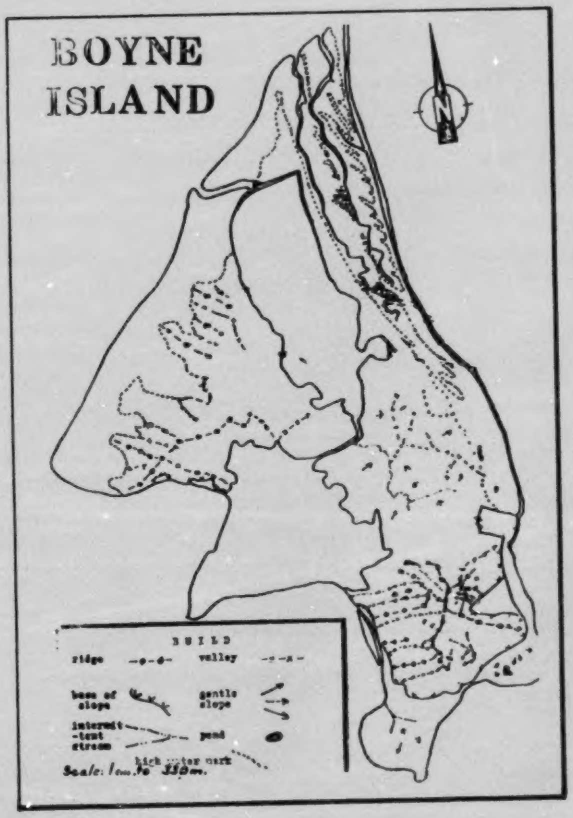
____________________ ____________________

List 4 words not on the list which best express your feelings about this area.

____________________ ____________________

____________________ ____________________

(Modified from [illegible] and [illegible])



BOYNE ISLAND

## APPENDIX III

## GUIDELINES FOR THE E.I.S. AUSTAL SMELTER AT BOYNE ISLAND

A Guide for Group Advisers

### PROPOSED DEVELOPMENT

Describe the proposal giving details of the following:

*Location*

- include site map

*Plant Layout*

- size and position of buildings, roads;
- positioning of various operations.

*Smelter Process*

- list the inputs. Give details of quantities, sources, all phases of transport to the site, storage. In addition, outline water and power requirements;
- describe reactions, processes, machinery and plant conveying and handling of all process components. In particular, note stages in the process of potential environmental concern;
- list outputs (finished products and by-products). Give details of quantities, storage and all phases of the transport of such products from the site.

*Smelter Operations*

- give details of staffing including numbers, means of transport.

*Construction*

Describe timing of construction works:

- clearing, levelling, landscaping;
- schedule and number of persons;
- transport of major process units to site;
- disposal of construction waste material.

*Associated Developments*

- give details of any proposed infrastructure developments to be initiated by the Company, including:
  — accommodation,
  — roads,
  — sewerage services,
  — port facilities (describe any dredging or reclamation involved in the project).

### THE EXISTING GREEN MEADOWS ENVIRONMENT

*The Natural Environment*

Provide details of:

- land forms, especially unique physical features;
- soil types;
- mineral resources, sedimentation, erosion;
- hydrology — surface, underground, drainage patterns, quality, recharge;
- climate, the atmosphere including meteorological conditions and air quality;
- list species of flora and fauna occurring at Green Meadows, indicate abundance and distribution. In particular, note the presence of any species of particular environmental significance;
- land use — describe existing land tenure, town plan zonings and land use (recreation, fishing, mining, grazing, etc.).

*The Man-Made Environment*

- note any archaeological or historical features which exist on or near the proposed site, especially places or things of value to the Aboriginal heritage;
- describe the facilities available in the district, particularly those relating to housing, transport, education, childminding, health and recreation. Indicate any deficiencies currently apparent by reference to population growth characteristics.

### ENVIRONMENTAL EVALUATION

*Impact on the Natural Environment of Chemical Pollution*

Describe the impact resulting from chemical pollution on the environment;

- indicate nature, quantities, location, regularity of emission and dispersal pattern of pollutants;
- describe expected impact, both long and short term, direct and indirect, on flora and fauna, paying particular attention to species comprising dune vegetation and those of commercial interest;
- discuss any standards it is proposed to adopt and any safeguards or controls to be implemented.

Pay particular attention to the following chemical pollutants:

- air pollutants;
- water pollutants such as direct liquid effluents, run-off from storage, storm water, sewerage and sullage, fallouts;
- solid wastes.

Describe the impact of other kinds of pollution including:

*Thermal Pollution*

- describe the extent to which the operation of the smelter will affect the temperature of the atmosphere and water bodies;

- discuss the likely impact of this on wildlife, vegetation, etc.

*Noise*

- report on the nature, regularity, level and distribution of noise, particularly that associated with construction work, handling, transportation and operation of machinery;
- note any measures to be adopted to modify noise impact, especially in relation to beach recreation and proposed residential areas.

*Visual Pollution*

- detail the aesthetics of the smelter and associated infrastructure, particularly in relation to proposed residential developments;
- state the extent to which the plant will be visible from any vantage points.

*Clearing, Construction and Road Development*

- describe the likely effects of establishing the smelter and associated infrastructure on both the marine and terrestrial environment. Note the extent to which clearance of vegetation will be necessary and discuss expected secondary impact on wildlife. Note in particular whether areas to be disturbed are habitats of significance for fauna conservation purposes.

*Impact on the Social Environment*

- describe the extent and nature of population changes expected to accompany the establishment of the smelter; discuss the likely impact of this expansion on the social infrastructure of surrounding townships, indicating the extent to which projected demands are likely to be met by existing facilities;
- describe any measures taken or proposed by the company to ensure that housing, transport (both road and sea), utilities (water, electricity), commercial interests, services (health, childminding, etc.), entertainment and recreational facilities will be adequate;
- discuss the extent to which the actual operation of the smelter will have social impacts beyond the immediate plant site. For example, describe the social effects of transportation of materials and staff, and the likely effects of the plant on recreational activities in the area.

# WALMIT DIVIDED

*J. Walker and J. Mitchell*
*Canberra College of Advanced Education*

*Walmit Divided* is a curriculum offering that is based on a very simple idea. In essence it is a simulation program involving the creation of a hypothetical township located somewhere in Australia. The settlement is intended to embody the main characteristics of any small town with a population of around three thousand to five thousand souls.

The materials consist of:

- scale maps of Walmit
- basic profiles of sixty-five (or 130 if both the male and female roles on each profile card are used) inhabitants whose only common element is an active interest in community affairs
- a set of seven scenarios which suggest situations where disagreements and tension may arise in the township

In our view, ideas are more important than the printed materials of a curriculum and therefore the Walmit materials are minimal. Furthermore it is our persuasion that professional teachers can better realise what they see as the possibilities of an idea if they are unconstrained by notions of the designer's intentions. To put it another way, we believe teachers using *Walmit Divided* will benefit more by talking to other teachers than by reading a Walmit Manual. For example, during trials of the materials some teachers discarded most of our scenarios and translated local controversies into the Walmit situation. This seemed to us to be spendid.

As proof of our conviction that manuals for this type of curriculum can be cumbersome, a non-guide to Walmit is available. It will be of little assistance in terms of directions, although we think it does raise some issues.

*Walmit Divided* promotes those values decided by the teacher and/or the children and as such can be used to develop an environmental ethic, or a racial ethic. . . It could also be used to discover some of the prevailing ethics of the classroom!

It has been used successfully with Year 6 children in country towns in New South Wales and with inner urban children in Adelaide. With a minimum of modification it can be used with older children.

*Walmit Divided* has been published separately by CDC and is available from: Curriculum Development Centre, P.O. Box 52, Dickson, A.C.T. 2602.

# *STUDYING THE LOCAL URBAN ENVIRONMENT*

*Ian Rule*

---

### PREAMBLE

Most Australians live in the rapidly changing suburbs of large cities. Yet these are rarely the object of classroom study. In this article, and after outlining various approaches to the study of the evolution of suburban areas, Ian Rule describes how he approached the problem with his Year 10 students in South Preston, a Melbourne suburb. He also indicates how the approach he used during a five-week unit of work could be extended. Some of these activities as well as classroom and fieldwork tasks he set his students are outlined in the three appendices.

---

## B. IN THE LOCAL AREA

### INTRODUCTION — A POSSIBLE APPROACH

Many Australians live in the suburbs of large cities. These suburbs are constantly changing and often appear as a confusing mixture of shops, houses, factories, roads and open space. Some features are more permanent than others, however. Roads, for instance, rarely change. Once a road pattern is laid down in an urban area it usually remains with only minor changes such as widening. By comparison, buildings come and go, although their replacements may have similar functions: an old hotel may be replaced by a new one on the same site, or old houses may be replaced by a block of flats.

By beginning an examination of the local urban environment at the stage when the area was first settled, it is possible to build up a picture of what the area was like as it grew and changed. A study of the evolution of the area would then enable students to see how the complex pattern evolved and what forces shaped the area. In this article I illustrate how this approach could be followed, and give specific examples from a unit of work undertaken with two Year 10 classes.

### STAGES OR FACTORS?

The study of the local area should take place within a framework which enables the student to see the uniqueness of the area whilst at the same time recognising the position of the local area in the general development of the region. There are basically two possible approaches. The first is a look at stages of urban evolution. The second is to look at the evolution of the urban area in terms of the factors which have shaped it.

#### Stages

For Australian capital cities the most useful approach is to identify three stages, based on transport facilities.

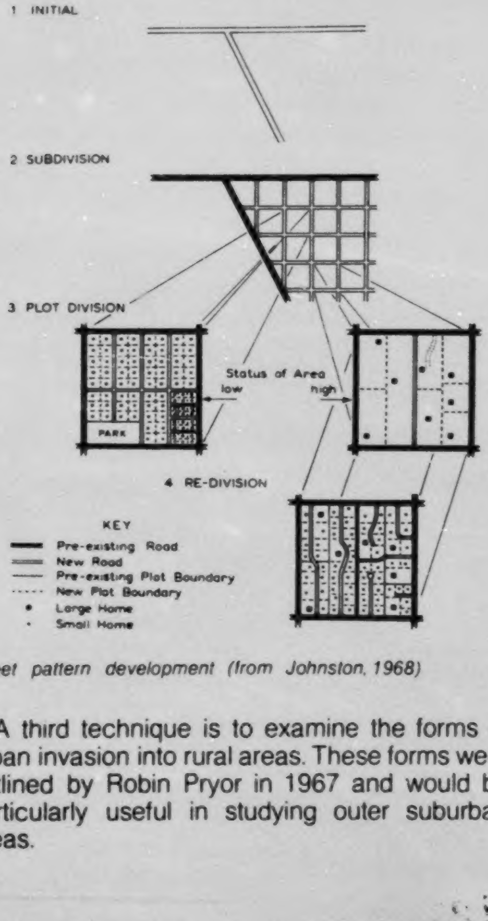
*Stage 1: 'The Walking City':* This covers the period up to the 1880s when population was small and clustered close to the city centre. People either walked or rode horses.

*Stage 2: 'The Public Transport City':* During this stage trains and trams enabled people to live away from the city centre and travel daily on the public transport. The cities developed fingers of growth along the public transport routes.

*Stage 3: 'The Automobile City':* The areas between the fingers of growth were filled in (see Barlow, 1977, pp. 454-6).

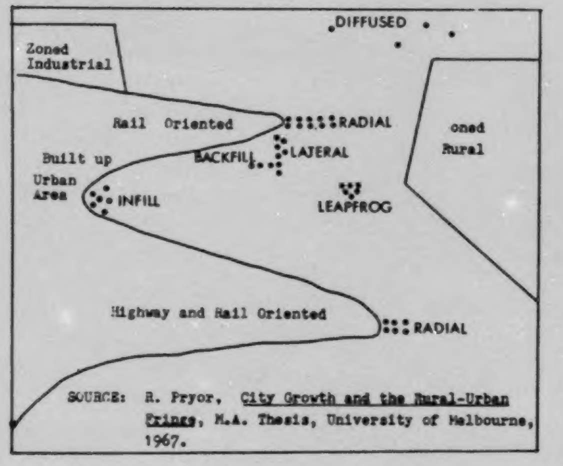
This approach can be applied to almost all of Australia's cities. The framework within which the local study is carried out, therefore, has significance in terms of the overall urban development of the time. These stages can also be identified in cities in the United States and Britain. The approach does have limitations, however, in that a particular part of the city may not have passed through each of these stages. The smaller the area to be studied the more difficult it would be to observe the effects of these different stages.

Another way of identifying stages of growth has been suggested by R.J. Johnston in his study of the development of Melbourne's street pattern (see below). His first stage was the creation of roads which took the path of least resistance to the pastoralists' holdings. This was then followed by the superimposition of a grid pattern of farm holdings where boundaries often formed arterial roads. This stage was followed by plot subdivision, a feature of the 1890s when the agricultural holdings were subdivided. Some high status areas however escaped this and were divided later.



*Street pattern development (from Johnston, 1968)*

A third technique is to examine the forms or urban invasion into rural areas. These forms were outlined by Robin Pryor in 1967 and would be particularly useful in studying outer suburban areas.



SOURCE: R. Pryor, City Growth and the Rural-Urban Fringe, M.A. Thesis, University of Melbourne, 1967.

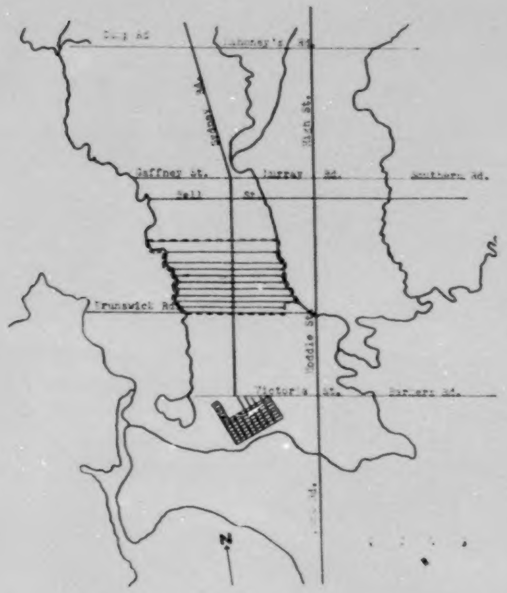
*Forms of urban growth (after Pryor, 1967)*

For some areas, the best way of identifying stages would be in terms of some local event such as the discovery of minerals.

## Factors

The second main approach to studying the evolution of urban areas is through an analysis of the factors which have produced the patterns. In this approach students would follow through certain factors which have shaped an area and investigate how these influenced the particular settlement patterns. The link between the factors operating and the patterns produced is clearest with those factors which operate over a defined area only, such as the provision of sewerage and water supply. For other factors, such as railway development, there is usually a concentration of influence over a small area. It must be realised that different factors can produce similar patterns, so that one cannot infer from the patterns produced which factors were operative. Given this limitation, it is possible to identify five major factors which operate in most Australian urban areas.

*Transport/Distance:* Now that most households have cars there is greater flexibility in terms of where people can live whilst still having easy access to work and shops. Prior to 1945, when this was not the case, main roads, railways and tramways were of critical importance, as people were not prepared to live very far from these lines of connection. In most Australian cities the boom of the 1880s saw the mushrooming of railway lines throughout the cities. The earliest roads were often farm boundaries and many of these have remained as main roads today. In Brunswick, Melbourne, for example, the first survey created a number of thin blocks of land with a series of east-west boundaries. Other roads developed as a means of getting to the gold fields of central Victoria. As a result of the large volume of traffic they assumed importance commercially and often developed as shopping centres. Modern roads and better transport have also enabled cities to grow to the extent of absorbing nearby cities. By 1976 the Brisbane urban area, for example, had grown to include Ipswich and now extends some 40 km to the southwest of the city centre.



*Original survey 1837, showing some present day roads which came into being as a result of this subdivision*

*Provision of Services:* Provision of services such as sewerage, water, gas and later electricity also affected where people would live and how urban areas would develop. The tendency was for these services to follow the existing lines of communication.

*Employment:* Most people who lived in the suburbs in the earlier years lived within walking distance from their place of employment. Some of the workers even lived on the land that was purchased by the factory owners next to the factory.

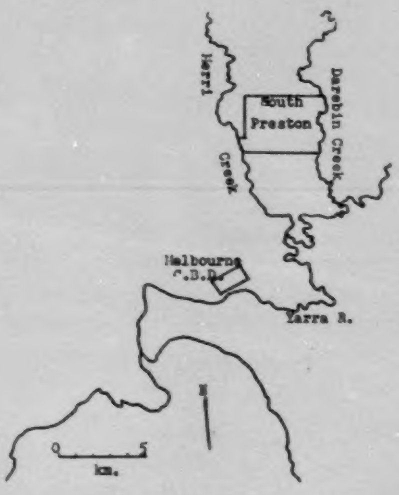
*Physical Features:* Areas which were regarded as unsuitable were often not developed until later, or were used for industry rather than for housing. The industrial areas of Footscray and Fishermans Bend in Melbourne are on low swampy land, as is some of the industrial land around Botany Bay in Sydney. The poor land of the West Lakes area to the west of Adelaide was not fully developed until after 1969 when residential, recreational and commercial development was undertaken by the South Australian Government. Large rivers such as the Swan in Perth also affect the way the city developed. In Melbourne, particularly in the north, rivers and creeks flow towards the city centre and the main areas of development tend to be the intervening wedges. This restricted east-west movement. Hills too can influence the growth of an urban area. Adelaide's elongated shape reflects the restrictions the Mount Lofty Ranges impose on eastward expansion.

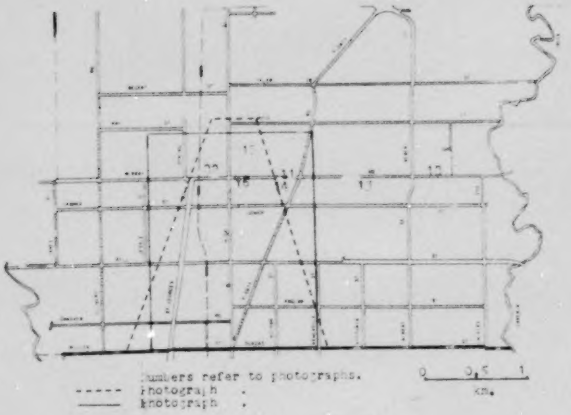
*Government:* The spread of settlement has rarely been held up for the want of new land. During the boom of the 1890s large tracts of land were subdivided for residential use — far more in fact than was needed. Many blocks of land and even estates had to wait until later to be occupied. The same situation occurred in the 1920s. Zoning regulations restrict industrial, commercial and residential activities to particular areas and play a vital part in determining what the local area will look like. Other government activities also need to be considered. The Housing Commission, for example, can be responsible for the development of large areas. In Broadmeadows, 15 km north of Melbourne, there are many hectares of housing commission estate land. The satellite city of Elizabeth in South Australia is another example of how governments and government agencies can influence the development of urban areas.

## USING THIS APPROACH IN THE CLASS ROOM

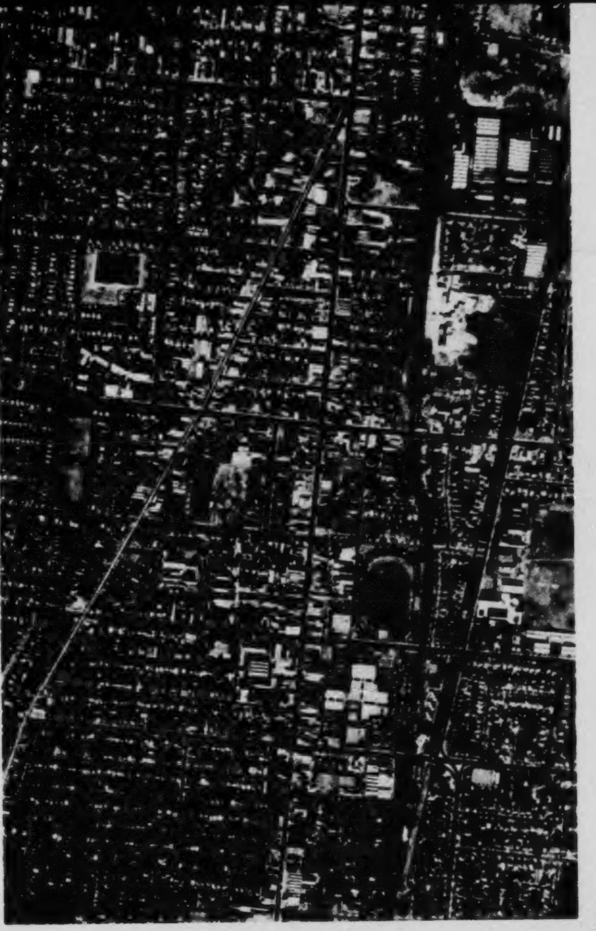
An approach through examining important factors was used as the basis of a unit of work for Year 10 students in Melbourne. There were three basic components to the work: a classroom study of the local area; an excursion to the area for some fieldwork, and, finally, the follow-up work which tied together the excursion and classroom work.

*South Preston study area*

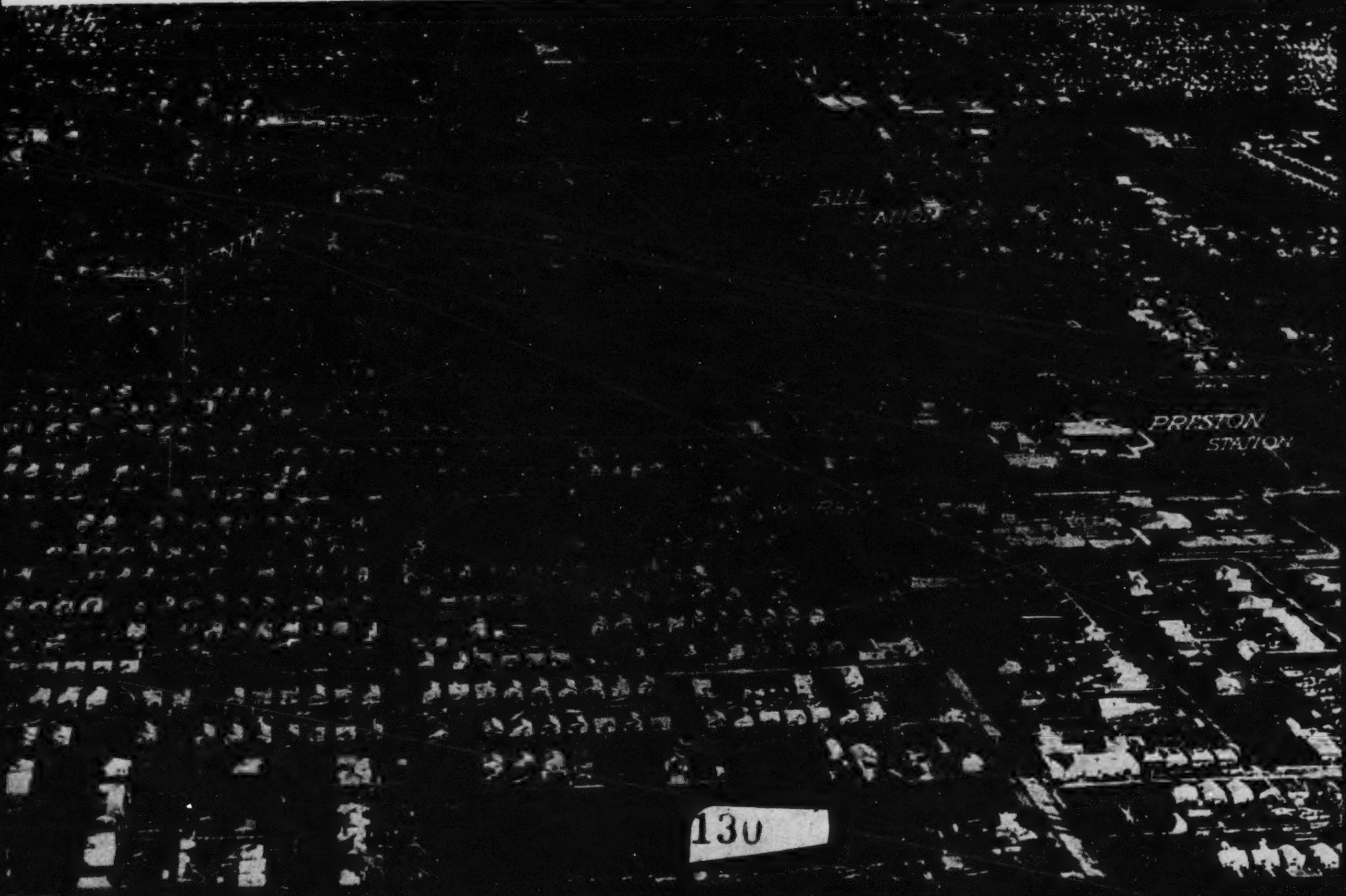



Numbers refer to photographs.
----- Photograph .
—— Photograph .
0 0.5 1
km.

The area studied was the southern half of the municipality of Preston, which is situated 10 km north of Melbourne. The unit was introduced by asking students their impressions of the local area. It was then suggested that to fully understand the complexity of the areas we should 'start again' and build up a picture of the area like a jigsaw, piece by piece until the final total picture emerged. The following photographs provided a valuable base for this discussion. The students



*Preston in 1976 (Reproduced by permission of the Surveyor-General of Victoria.)*


PRESTON
STATION

*Preston in 1926 taken by 'Airspy' and published in* The Weekly Times, *14 July 1926 (Reproduced with acknowledgement to* The Weekly Times, *Melbourne.)*

then worked through the unit of work on Preston, outlined in Appendix I, which looked at the way Preston developed and at the factors which made it develop the way it did. This took two weeks (three forty-minute periods per week). The next step was to go to Preston.

Having studied the area, the students had reached the conclusion that Preston developed first along the main north/south thoroughfare — High Street, and that, as the railway line and the main water supply line also ran north/south close to High Street, the oldest parts of Preston would follow this axis. The task of the students was to walk across Preston, recording land uses and the approximate age of houses as they went (see Appendix II). This took them an hour to do. As three roads run east/west across Preston, the class was divided into twelve groups. Each group recorded one side of one road, half the group starting in the east and the other half in the west. When they returned to school, the students redrew their rough maps and completed a report outlining some of the conclusions they had reached.

## EVALUATION OF THE FIELD WORK

The tasks on the excursion were simple. Classroom discussion was needed to establish criteria by which to judge the age of houses. Generally, pre 1920 houses had narrow blocks of land, were of weatherboard construction, more often single fronted and had no driveway for cars. The houses from the 1920s to 1960s were on larger blocks, were of weatherboard, concrete or red brick construction and had driveways for cars. The most recent (post-1960) were on the largest blocks and were of cream or coloured bricks and were usually double or triple fronted.

Prior to the excursion the students were required to draw up large maps of their particular transect to be completed during the walk. By having twelve small groups, direct supervision was not possible all the time but, given the relatively simple tasks and the short time involved, this did not pose too much of a problem. Although attitudes are always hard to measure, some of the students seemed to have an increased feeling for the local environment.

## EXTENSIONS

This particular unit of work only occupied a period of four to five weeks. A study such as this, however, could be used as a foundation for further work. Having taken the students up to the present, the way is open to tackle questions about the future evolution of the area. Some suggestions for extending this work are given below.

### Research

In the unit of work just described the data were provided for the students. It would be possible for students to research these facts for themselves. They would, however, be best undertaken by senior students as some of the sources of information are obscure. Time would also need to be spent outside the school at libraries and local government offices.

### Interview

A clearer picture of the local area could be built up by the students interviewing older residents. Local historical societies are often very pleased to discuss local history with interested students and many older people have very clear recollections of life as it used to be. The local area may have changed even within the students' own memory. Students may be able to remember such things as demolition of buildings to allow for road widening, the closing of the suburban cinema, the advent of large supermarkets, the closure of suburban rubbish tips when full and in outer areas the opening up of new housing estates.

### House Histories

Students could write 'house histories' of selected houses in the local area, thus giving more detail to the overall picture. If the thirty students in a class were each to write three house histories this would add considerably to the total understanding of the area. A house history would seek to find out when the house was built, who the occupants were, what additions or alterations were made and when and whether it was built before or after the houses around it (see Appendix III). This approach helps students to view the houses as homes for people rather than just buildings, thereby increasing the feeling a student has for his local area. Other buildings such as rows of shops and hotels also lend themselves to this type of study as they frequently have the date of construction written on them. Public buildings with foundation stones also record the date of construction.

### Simulation Game

In its simplest form the simulation could consist of students having a map of the local area and cardboard cut-outs to represent railways, tramways, factories, ships, houses, parks and quarries. As the story of the development of the area unfolds the students would place the cardboard pieces on the maps in the appropriate places, recording the situation at regular time intervals. A further development would be to have a series of cards outlining the general developments and allowing students to decide the best possible location for the particular feature. For example if a general development was 'a period of extensive railway buildings', students could decide where to put the railway. This would then affect where they would choose to develop residential areas given another general development of 'rapid population increase'. The final results could be compared with the actual pattern of settlement and the reason for the difference could then be discussed. In this way the influence of the individual decision can be observed. *Lynwood — Urban Renewal* is a good example of an appropriate simulation.

### Photographs

For most urban areas old photographs can be readily obtained, from books, historical societies, local newspapers or individuals. A useful exercise would be to prepare a series of 'then and now' photographs highlighting the changes which have occurred. Even over short periods of time such as five or ten years, quite significant changes are often observed.

### Street Names

Many street names give a clue as to how the areas developed, and the original nature of the area. They exist as reminders of the past. This can be illustrated with a few examples from Preston:

*Gower Street:* named after the original owner of the land bounded by what is now Gower Street.

*Wood Street:* the road which ran beside Wood's general store — the first store in Preston.

*Water Street:* the road which ran to the Darebin Creek and was used by the cattlemen to get water for their stock.

*Spring Street:* a road often flooded due to the water spring.

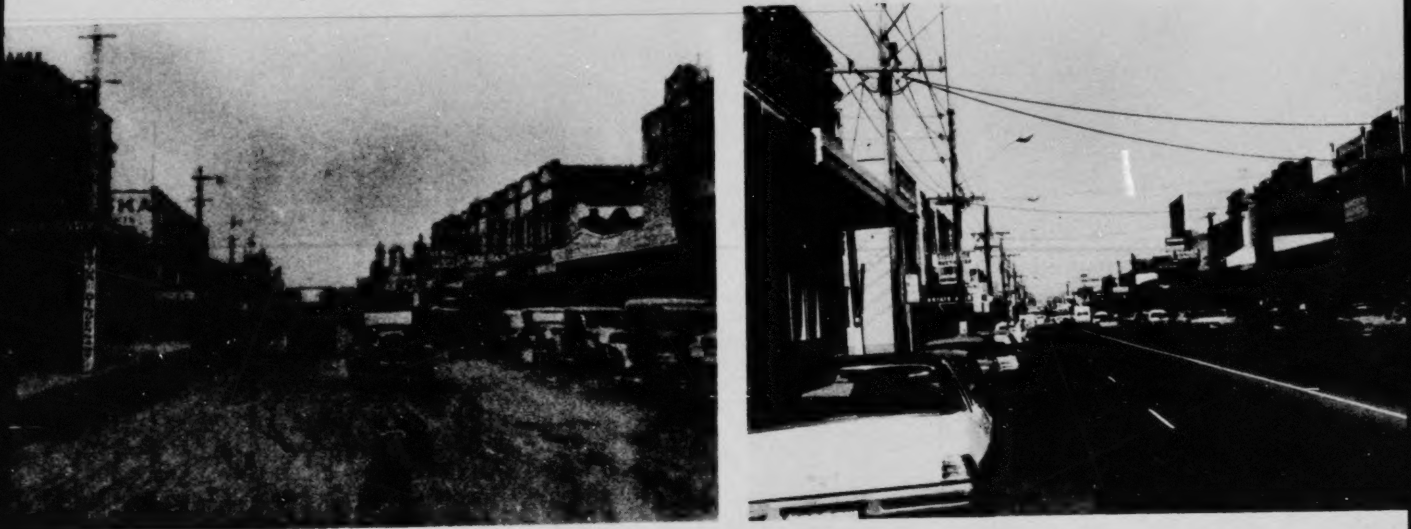
### Responsible Action

There are many ways in which students could use the understanding they developed in order to make a contribution to the future of the area. Students could examine the future plans for the area, discuss them with the local authorities and take a responsible role in discussion of any controversial issues, such as urban renewal, urban freeways and proposed shopping centres. Zoning regulations could be critically evaluated. Perhaps too, students could see an area of community need which remained unfulfilled as the area developed. They could formulate suggestions for the local authorities. These need not necessarily be of major proportion but could relate to such things as the need for more parkland in an area or the need for more trees in a particular street.

Responsible action could involve the students doing something themselves about an area. For example they could undertake to assist in the restoration of an urban creek to its original condition, or it could take the form of increasing the general community awareness about local environment. Displays of maps and other material in the local library, for example, would be one way students could contribute to the dissemination of information about the local environment.

### SOURCES

Sources of information of course will vary from place to place. Nevertheless there are some sources which are common to most areas and also readily available.



*Then and now: High Street, Preston looking south, 1926 and 1979*

*Local Histories:* Many areas now have interesting and thorough histories written about them.

*Maps:* The lands department has accurate maps showing the alienation of crown land. It is also possible, to produce one's own maps. The most accurate sources of information are the rate books of the local government authority. These give details of the number of houses, shops and factories and their exact location. Information regarding factories is obscured by voluminous permits regarding minor alterations and additions to existing buildings. The Titles Office does have information but under the present system it is impossible to obtain sufficient information to build up a picture of what the urban area looked like at a particular time. Directories, which list all residents of an area by street, are a less reliable source, but they are far more accessible.

*Other Sources:* Some of the other sources of information have already been mentioned such as local historical societies and personal interview. Other sources may be useful one area and not for another. The list below contains some of the sources which may be relevant to many areas.

Social Education Materials Project (S.E.M.P.) *Community Growth Community Evolution* These consist of a series of work cards which look at a number of aspects of urban evolution. There is a particular emphasis on the social development of the local area.

Barlow, M.H. and Newton, R.G. (1977), *Patterns and Processes in Man's Economic Environment*, McGraw Hill Book Company, Sydney.

Cannon, M. (1966), *The Land Boomers*. Melbourne University Press, Melbourne. An excellent general book on the land boom of the 1880s.

Gibbs B.A. (1915), *Water Supply Systems of the Melbourne and Metropolitan Board of Works.*

Johnston, R.J. (1968), 'An Outline of the Development of Melbourne's Street Pattern'. *The Australian Geographer*, 10 (6), 453-65.

Marriot, K. (1975), *The Yarra Valley*, Sorrett, Melbourne, Pages 124-8 of this book have an excellent analysis of the different housing styles in Melbourne.

Melbourne & Metropolitan Board of Works (1967), *Report of the First 75 Years (1891-1966).*

Melbourne & Metropolitan Board of Works (1935), *Water Supply and Sewerage Systems of the M.W.B.W.* This was compiled by the then secretary of the Board.

Pryor, R.J. (1967), *City Growth and the Rural-Urban Fringe*, unpublished M.A. Thesis, University of Melbourne.

Schedvin, C.B. and McCarty, J.W. (1974), *Urbanisation in Australia — The Nineteenth Century*, Sydney University Press, Sydney. This booklet is a reprint of articles published in 1970 in the *Australian Economic History Review*. Of particular interest are articles by J.W. McCarty: 'Australian Capital Cities in the Nineteenth Century'; Graeme Davison: 'Public Utilities and the Expansion of Melbourne in the 1880s; Weston Bate: 'The Urban Sprinkle: Country Towns and Australian Regional History'; and Sean Glynn: 'Approach to Urban History; the Case for Caution'.

Schnore, L.R. (1957), 'The Growth of Metropolitan Suburbs'. *American Sociological Review*, 22, 165-173.

Seeger, R.C. (1941, 1947), 'The History of Melbourne's Water Supply', *Victorian Historical Magazine*, 19, 107-199; 22, 22-47.

Local newspapers are another valuable source of information. It is often a good idea to examine back copies of strategic times e.g. — opening of a railway, changes in local government status and jubilees and centenaries. Newspaper archives are also a valuable source of information. For recent changes, vertical air photographs are useful.

## APPENDIX I

These are a selection of tasks given to the students.

### Task 1

(i) Why would toll gates be a convenient place to have a store or hotel?

(ii) In the early stages of Preston's development, most movement through the area was in a north-south direction. Why do you think this was the case? What would hinder east-west movement through the area?

### Task 2

(i) Land west of Jessie Street was subdivided for urban use before 1894, yet by 1918 it was still almost unoccupied. Why would the construction of a tram line along Gilbert Road have helped develop this area after 1920?

(ii) Land north of Murray Road, between High Street and Plenty Road was also subdivided before 1894. During the 1920s this area filled up rapidly. Why would this subdivision have been more successful than the subdivisions west of Jessie Street?

(iii) Describe the pattern of settlement in 1945. Which areas still have room for closer settlement?

**Task 3**

(i) The newer industries in East Preston did not develop until after 1945 when motor transport became more popular. Why would motor transport be so important in this area?

(ii) The early industries had special reasons for locating in Preston. For the industries which came, later Preston was just a convenient location. Give examples from the table of industries above to show how this could be true.

**Task 4**

Draw a sketch map of that part of Preston shown in the aerial photograph. Shade on your map these areas which are devoted to industry or open space.

**Task 5**

(i) Apart from residential and industrial, what other forms of land-use can be seen on the photograph?

(ii) Is there room for industrial expansion in this area? Explain your answer.

(iii) What evidence is there from the photograph to suggest that Bell Street is one of the main through roads in the area?

**Task 6**

Refer to the graph of population growth in Preston from 1891 to 1976.

(i) During which period did Preston have the most rapid population growth?

(ii) Why would it have been impossible for Preston's growth to continue to increase rapidly after 1961?

(iii) Preston's population dropped by 3200 in the period 1971 to 1976. Why might people wish to leave this area?

(iv) Under what circumstances might it be possible for Preston's population to grow again in the future?

**Task 7**

SUMMARY QUESTIONS

(i) Before 1920 most settlement in Preston was concentrated in a narrow strip to either side of High Street. What factors created this pattern?

(ii) What factors enabled settlement to spread east and west from this early settlement concentration after 1920?

(iii) How does the location of basalt deposits in the east of Preston help explain the appearance and growth of Preston?

**Task 8**

EXTENSION QUESTIONS

(i) What changes have occurred in your suburb or town? Are there any similarities between the changes in your area and those of Preston? You could get information by talking to older residents or from your local library.

(ii) A number of suburbs in the large cities have developed almost completely since 1945. How might these suburbs then be different from Preston, which began to develop last century?

## APPENDIX II

### YEAR 10 GEOGRAPHY EXCURSION — PRESTON

**Introduction:**

In our studies this term, we have been looking at towns and cities. We have had a close look at how the suburb of Preston grew to be what it is like today.

The aim of the excursion is to look at Preston today and attempt to describe *what* is there and *why* it looks like it does.

**Your Task**

(a) ON THE EXCURSION:

You are required to record the land use along the street you are following. Use the following classifications to make on your map:

(A) Houses
  (i) Old (pre-1920s)
  (ii) Medium age (1920s-1960s)
  (iii) New (1960s)
  (iv) Housing Commission
  (v) Flats/Units
(B) Factories
(C) Shops/Service Stations
(D) Offices
(E) Public Buildings
  (i) Schools
  (ii) Health Centres & Hospitals
  (iii) City Offices
  (iv) Other—specify
(F) Open Space—Recreation—parks

Also on your map record transport facilities—major roads, railways, tramways.

(b) AFTER THE EXCURSION:

(i) *Map*

Draw up a fair copy (neat, coloured in, no alterations) of your map. This should be presented with your report.

134

(ii) *The Report*

- (a) What changes in land use occurred as you moved towards High Street?
- (b) Did houses tend to get older as you moved towards the centre of Preston?
- (c) Is there any evidence of urban renewal in Preston?
- (d) Is the change from basalt deposits accompanied by a change in land use? (Those of you walking from the west of Preston will not be able to answer this question.)
- (e) Was there any evidence of traffic congestion? Where?
- (f) Is there any evidence of expansion in the industrial areas of Preston?

# APPENDIX III

## HOUSE HISTORY
## 223 Murray Road Preston

The land on which this house stands was offered for sale on Saturday 18th August 1888 as part of the Post Office Estate. This was the height of the land boom, yet only 45 out of 113 blocks were sold. Those lots which were left, were offered again at auction on Saturday 20th October 1888. On August 8th 1911 Richard S. Rule purchased Lots 111 and 112 for a sum of £46. On July 22 1914 work began on building the house, but when war broke out in August 1914 the builders walked off the job leaving the house unfinished. The owners continued to work themselves and moved into the house later in 1914. At the time there were very few houses in Murray Road. From then until 1960, only minor changes were made, such as the building of stables in the back yard. After 1960 with the death of Amy S. Rule the house was sold, the new owners have substantially altered the house by removing the verandah and replacing the weatherboards with imitation brick cladding. The roof has also been remodelled.

# *INTERACTION WITH THE LOCAL ENVIRONMENT: A PROGRAM FOR YEAR 11 STUDENTS*

*Denise Kennedy*

---

## PREAMBLE

Acute youth unemployment in Dandenong, as in many outer suburban areas, has caused many students to stay on at Cleeland High School, even though they have neither the interest nor the ability to undertake academically-oriented courses. Responding to these students' needs, Denise Kennedy has developed a course, first taught in 1977, which uses the area adjacent to the school as a focus to develop in students an awareness of their environment and an informed commitment to its enhancement. In this article she outlines the aims of the course before describing its structure and highlighting some of the enquiry-oriented activities that contributed to its success.

---

## SETTING THE SCENE

Cleeland High School is typical of schools located in communities which have experienced recent, rapid urbanisation. It draws its students from Dandenong, a satellite city of Melbourne, which is characterised by high density flat development and Housing Commission and other medium density residential areas which are rapidly encroaching on the surrounding small farms. Dandenong was originally a small country town, but the rapid growth, together with minimal community development due to work demands placed on residents, has caused extensive dislocation within the community whose population is now composed of several ethnic groups with diverse educational and cultural backgrounds. The students at Cleeland reflect this diversity. Many come from single parent homes or homes where both parents work. Acute youth unemployment has caused many students to remain at school, even though they have neither the interest nor ability to undertake academically oriented studies.

An alternative course in science in Year 11 was an obvious need. The course had to be directly relevant, had to cater for the diversity in the students' backgrounds, and should try to bring students to a common point of awareness about themselves and how they relate to one another and to their environment. While the course should be complete in itself, it should also provide a sound base for further study.

The program 'Interaction with the Local Environment' was developed to achieve these intentions for it was felt, in the short term at least, that the most concrete aspect of the students' lives was their own surroundings. These were familiar to all, were easily accessible, contained a multitude of resources, and provided a stepping stone for the long term aim of developing in students an awareness of, a concern for and a commitment to the local environment. The program is essentially enquiry based for I believe learning is more effective if students are actively involved in making decisions about their own education. The pattern of enquiry has been shaped to ensure that students develop a number of fundamental concepts concerning mankind's relationship to the environment. Although designed for a Year 11 class, the program can be adapted to suit most classes and environments for its major purposes are to facilitate students' interest, encourage their creativity, and develop their decision-making skills. These purposes are designed to be achieved in a fairly open situation where the students' interests and enthusiasm influence the directions the program takes.

## AIMS OF THE PROGRAM

As previously stated, the primary aim was the heightening of student awareness and concern for the local environment in a way that the student could use the understandings developed through the program to formulate opinions on local issues and arrive at the point where he or she would support these.

To achieve this basically attitudinal aim, the following detailed objectives were formulated. They were intended to provide a firm base for the structure of the course and have been of enormous assistance in keeping the course from becoming a hotch-potch of interesting but unrelated topics. The students were to gain:

- a knowledge of the intricate and complex cycles and inter-relationships working within the environment;
- an awareness of man's influence in these systems which could be beneficial or detrimental in effect;
- an awareness of the specific environmental problems that exist in the local environment;
- an understanding that most environmental problems are complex and not easily solved;
- a working knowledge of the decision-making processes involved in the local environment;
- a knowledge that the student has a voice in influencing changes in the environment;
- an understanding that the ultimate consideration in the functioning of an environmental system is the energy efficiency of that system.

In addition, three broad concepts were identified as being fundamental to the course, understanding of which was essential for all students:

- a natural environment has many complexities which are delicately balanced;
- man has become part of these environments on many levels and has affected them in varying degrees;
- man is able to make conscious decisions about his future environment.

## SELECTION OF A LOCAL FOCUS

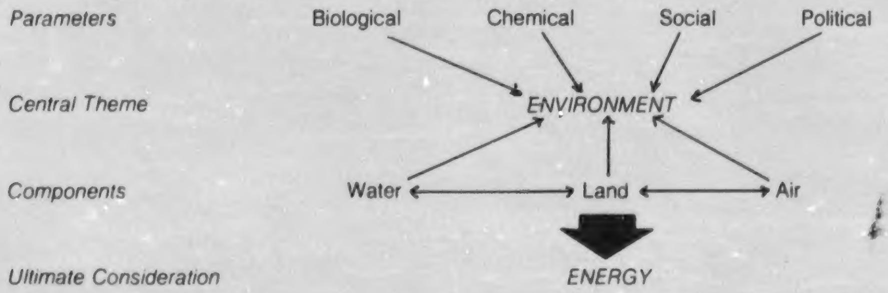
Because the objectives and concepts are very broad, any local phenomena could be the starting point for the course, providing they are in close proximity to the school and are familiar to the students. The necessity for the initial investigations being based on phenomena close to the school is founded on a number of reasons. Firstly, the class needs to be able to visit the site quickly and easily because this facilitates a comprehensive investigation and enables the documenting of any changes that occur over an extended period of time. Secondly, it makes provision for student investigation outside scheduled class time. Thirdly, it overcomes many of the problems associated with extended excursions.

Focusing on the local environment has another advantage in that it increases the availability and choice of speakers. These can be drawn from parents, neighbours, other teachers, friends, the general public and local government agencies. To hear from people that they took for granted, the canteen manager for example, has given Cleeland students another dimension to their comprehension of their surroundings.

Selecting phenomena that are well known to students, at least initially, is most important, for students are the most significant and available resource in the local environment. By talking to students in the initial stages to determine their backgrounds, allow for modification of the course structure to meet their needs, interests and experience.

## COURSE OUTLINE — THE FRAMEWORK

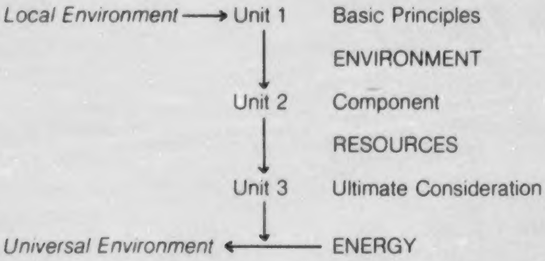
The following is a diagrammatic framework for the course. Within the central theme of 'environment' and its emphasis on local examples, the course had the three main components of water, land and air which could be examined using the four essential parameters or perspectives provided by biology, chemistry, the social sciences and political science. The understanding of some basic principles relating to



***Course Framework***

these parameters is essential to an understanding and analysis of environmental issues. The ultimate consideration in the course was exploration of the notion of energy.

The structure of the course was derived from this framework. Three units (basic principles operating in the local environment, resources and energy) were to be considered, with each broken up with various study areas.



***Course Sequence***

As shown in the following course outline, the local environment was studied from perspectives provided by biology, chemistry, the social sciences and political science is the first unit. The second unit involved the examination of the actual components of the environment, with particular reference again to the local setting. Energy was the focus of the third unit. This unit broadened students' perspectives of environment as energy use was examined at a global as well as a local scale. Incorporated in the overall scheme was provision for students to follow through an interest not directly covered by the course. They were to complete a case study on any topic they thought was relevant and interesting. This new-found knowledge was to be imparted to the rest of the class by way of seminar.

## COURSE OUTLINE IN SUMMARY FORM

| *Unit* | *Study Area* | *Basic Principles* |
|---|---|---|
| Environment | Biological | ecosystems, habitats, community, population, food webs, autotrophs, heterotrophs, indicator species, energy |
| | Chemical | natural cycles, eutrophication, man-made pollutants |
| | Political & social | communication on all levels |
| | | *Particular Emphasis* |
| Resources | Water | analysis, management, treatment |
| | Air | thermal inversions, the local climate, gaseous wastes |
| | Land | decision-making, including:<br>freeways (local) usage, specifically looked at garbage;<br>— packaging<br>— recycling |
| Energy | Home | usage, conservation |
| | Australia | depletion of resources |
| | World | alternatives |

## COURSE DETAILS

**Unit 1: Environment** (Term 1-13 weeks)

Analysis of local site (one session every week over an extended period)
Experiments in class, e.g. respiration, photosynthesis
Fly population studies (one session every week where possible)
Discussions
Excursions to a totally different environment for comparative studies
Assignments on ecosystems, population, cycling of nutrients
Extended reading — collect local newspaper articles and write a summary on a particular issue at the end of each term
Films, videos, speakers (when available)

**Unit 2: Resources** (Term 2-12 weeks)

Case Study on local or world scale using mainly second-hand data. (1 session a week for 8 weeks)

(a) *Water* — 4 weeks
    Analysis of a local source
    Visit the local treatment plant
    Speakers e.g. City engineer, representative of water and sewerage authority
    Survey of local residents concerning the drinking of purified water

(b) *Air* — 3 weeks
    Experiments on inversion layers
    Investigation of micro-climates mainly in the school ground
    Assignments on gaseous wastes
    Survey of local area for pollutors
    Analysis of car exhaust — the teachers' cars

(c) *Land* — 5 weeks
    Land use study of local area
    Investigation of local planning and decision-making
    Visit the City Council

Study of local freeways (is the local environment affected?)
Speakers for and against freeways
Simulation of Council decision on proposed freeway
Other land-use investigations: specifically land fill and the study of garbage, including the analysis of wastes in the home, survey the local market and shoppers concerning packaging, wastes and conscious decisions when buying products
Experiments in recycling as an alternative source of energy

**Unit 3: Energy** (Term 3-8 weeks)

Assess energy usage:
- at home (collect bills)
- at school (annual report)
- in the local area
- in the State
- in Australia

Investigate resource depletion by way of assignment,
- Speakers from the fuel suppliers
- Films
- Extended reading

## INTRODUCING THE COURSE

Introductory activities have a critical effect because they set the scene for the rest of the course. After considering several alternatives, the introductory activity decided on was to get students to acknowledge their own bodies as an environment which interacted with other environments. A lot of swift talking was necessary to gain their attention and co-operation initially. On reflection it was an excellent introduction, as even now, past students comment on its effectiveness in gaining their confidence and interest.

Desks were cleared away and the students told to find a space by themselves. Fortunately it was a sunny day which was an added bonus when the awareness activity was commenced. The students were told to close their eyes and to become aware of their bodies using senses other than sight. They were told to concentrate on what they smelt, heard and touched. After the initial giggles, the class settled down and became very relaxed and aware of each other. The idea of their own bodies being an environment, with inputs and outputs and having processes, was suggested and thoughts were to be directed along those lines.

After a few minutes they were told to sit down on the bare boards. Another suggestion was to take their minds outside the boundary of their bodies. They were told to listen to sounds outside their own bodies, feel the sun on their skin, feel the floor beneath them and be aware of the intense concentration in the room. A discussion was then held as to how and why they felt the way they did and what other ways the environment communicates to the individual. The exercise utilised the senses purposely.

The next step was to investigate the classroom and schoolgrounds as environments, but not using the conventional method of sight. In pairs, one student was blindfolded and led around the schoolyard without talking by the others. They were to use the senses of touch and smell to assess their 'new' environment. They would become aware that most organisms react with their environment not only with the use of sight but also by the use of all other senses.

To heighten the students' awareness of the use of their senses they were directed to stand near a tree. They then had to find out if a single tree could be classified as an environment. After investigating the bark, the limbs, the leaves and organisms present on the tree, most answered that it could be thought of as an entity in its own right.

Could they become a part of this environment? To answer this, the students were to imagine that they and their tree were one and the same. They once again had to close their eyes and hug the tree, smell it, feel it, lean against it and be aware of what they felt towards the tree. No discussion was held after this exercise. Instead each student wrote what he or she experienced during these activities and what feelings were aroused towards the tree. It was very satisfying to see that most had begun to understand the necessity to assess the environment using all the senses as well as theories and scientific analysis. Most stated that they had never really 'looked' at a tree and their respect and wonder of a living organism had been awakened. The reinforcement of their attitudes toward the environment and the heightening of their awareness and sensitivity was to be a long term objective during the remainder of the course.

Another benefit of the activities outside the classroom was that it introduced the students to expected behaviour out in the field, not only in organisational matters but also in the treatment of the flora and fauna.

## DEVELOPING THE COURSE — SELECTED EXAMPLES

From this initial introduction of the concept of environments, more detailed studies were commenced. I concentrate in detail here on some of the activities that contributed particularly to the success of the course.

## Interdisciplinary Approach

It was imperative that an integrated approach was adopted so that the local environment could be appreciated from as many view points as possible. Obviously, the most efficient method of achieving this is to utilise a number of interested staff from a variety of faculties but this has many inherent problems that usually hinder it being undertaken. Thus, the subject teacher is responsible for presenting information that is not strictly his or her discipline. Where personal knowledge was lacking, considerable interaction with other staff members is necessary.

A brief list of disciplines and how they could contribute to the study of the total environment follows. The suggested activities are self-explanatory and will not be expanded on.

| *Discipline* | *Suggested Aspects that Could be Investigated* |
|---|---|
| History | When and why the area was settled<br>Important events in the local area's history |
| Photography | Past and present aspects |
| Art | Sketches of important buildings, old trees, houses, monuments, etc. |
| Geography | Land forms and land-use maps |
| Biology | Organisms present, use as pollutant indicators |
| Ecology | Interrelationships of these organisms with the environment and each other<br>Components of the ecosystem<br>Stability of the ecosystem |
| Chemistry | Analysis of different components of the ecosystem |
| Earth Sciences | Affect of soil types on land use |
| Social Sciences | Communications |
| Political Science | Decision-making mechanisms |
| Home Economics | Distribution of resources to maintain an accepted standard of living of the individual and the community |
| Economics | Decision-making in the market place, which affect resource allocation |

The utilisation of the local environment to achieve the desired concepts was probably the main factor behind the success of the course. The logical place to begin was an investigation into the history of the area. The local historical society suggested that the area was settled mainly due to the availability of fresh water from the local creek. Thus the investigations turned to the creek for a comparison of its usefulness then and now. In studying other environments, I suggest a number of questions be sought, thus producing a logical sequence of events.

Why was the area settled?

How has it changed?

Has it changed for the better?

Is there a relationship between development and deterioration of the natural habitat?

What does the future hold for the area?

Who makes the decisions affecting the whole community?

How does the area relate to adjoining environments?

Has the area a place in the future of Australia?

## Local Water Studies

The school had a portable chemical laboratory (a HACH kit), and so emphasis was placed on measuring and analysing the creek water. These investigations were carried out over six weeks and tables and graphs were drawn to represent the data obtained. The relationships between different parameters (for example, presence of pollution and biological indicators) was then examined. This basic unit culminated in a comprehensive report on the Dandenong Creek by each student and covering a broad range of creek analysis.

Emphasis in the following units was shifted to the social, economic and political study areas. Data gathering for the analysis of the quality of the Dandenong Creek continued but with more emphasis on its value as a resource than as a body of water to analyse. A local paper was asked to report on the student activities which stimulated interest within the group as well as in the local community.

Publication of some of the data collected also encouraged the students to examine the importance of the creek in terms of clean water. As many parts of the area abutting the creek were unsewered, interest was aroused in the level of pollution in the creek and methods of sewerage treatment. Experiments were carried out including dissolved oxygen and *E. coli* counts and their relationship with faecal contamination. Investigations into the sewerage treatment process involved viewing films and listening to a speaker from the sewerage authority. These investigations culminated in an excursion to the local sewerage plant where students were given a guided tour. A question raised at the end of the tour gave the course its next direction. It referred to the use of the purified water. This is channelled out to sea, but one student suggested that it should be reused as the town's water supply. Others responded that it was an encroachment on individual rights and that each person should be able to choose the source of his or her water supply. Yet another group added that it should be left to a referendum, with the majority making the decision for everyone. An impromptu debate began.

To capitalise on this enthusiasm, it was suggested that the matter be taken up with a simulated Council meeting for a decision. This idea was accepted and ground work began as to how Council meetings were run, who attends, and how problems are finally solved. For this activity a visit to the Municipal Offices was beneficial.

A notice announcing the agenda of the Council meeting was published and various students were given roles to play. The three alternatives for the use of purified water were presented to the simulated Council members by a housewife, a business man, an industrialist, an economist, a conservationist, an advocator for civil rights and an engineer. Questions were raised by both the Council members and the gallery. After some heated arguments, with the Mayor becoming a little flustered, the twelve-member Council gave its decision. Because of the inadequate information at hand, the Council was not in a position to decide and so formed a sub-committee to investigate the problem in more depth: a good example of how some governmental decisions are delayed!

One suggestion presented at Council was the administering of a survey to determine what the people wanted. The class felt this was the next logical step but held some reservation about facing the public.

Before actually going out into the field, the students needed some elementary principles concerning survey work. These were dealt with by using different examples of surveys. Eventually, the questionnaire was formulated and the students were ready to confront the local shopper.

The students worked in pairs from predetermined spots all over town. They each had to survey ten people during the one and a half hour session but although the sample surveyed was too small for the results to be reliable, a discussion held later brought out some worthwhile facts. One was that a trial run should be undertaken so that ambiguities could be removed before the survey proper was conducted.

### Simulation Game

In the second unit, 'Resources', the issue of resource utilisation in freeways was sparked off by the location of a new freeway near the school. A second Council meeting was held to examine the effect of a proposed freeway running through some prime agricultural and industrial land in the area. Students took control and the meeting was well managed and run along very formal lines. The involvement of the students and their appreciation of the topic was apparent in their role playing, which was at times quite convincing. Many more relevant and pertinent questions were asked and the reasons for Council's decisions were published in the minutes produced the following week. The students showed a responsibility and initiative that had previously been hidden.

### Individual Case Studies

Also in the 'Resources' unit, a substantial amount of time was allocated to research for an individual case study. Some were allowed to work in pairs if the topic warranted it and if there was sufficient evidence produced that the work was shared equally. This activity was included for practical experience in handling second-hand data and preparing a scientific report.

Second-hand data are essential tools in assessing environmental issues. One necessary attribute is to be able to sift out the relevant key ideas of a particular theory, experiment on paper and use them in the right context. The students had first to locate the relevant information, decipher it, critically analyse its validity and then use it to compile an objective, coherent report. Many students also interviewed relevant people and carried out their own experiments.

### COMMENT

Although I have not detailed everything attempted in the course I hope that others will find some ideas useful and a base for the construction of a course suited to their school's unique environment. To have set out lesson by lesson the course I followed would only prompt boredom for teacher and student alike and would serve no useful purpose as it excludes the imagination and creativity we all have. Just commence with a general outline of what you see as important components of a course, focusing initially on a particular area or problem in the local environment and let it 'snowball' from there.

But I finish with a warning note. In a course such as this, the teacher is a major resource and so needs not only to be a focal point of the course but also to adopt varying roles. These include acting as an information disseminator, a sorting house, a directory, a guide when needed, someone with whom students can discuss matters of personal interest, and so on. This means that you must be able to interact with students outside class time and this requires a commitment to and an interest in the total development of the students. It is my experience that it is this that lies at the heart of any successful course.

# *EDUCATIONAL USE OF AN URBAN CREEK*

*S.L. Malcolm*

---

## PREAMBLE

An urban creek has been developed for use as an educational resource by pupils of the Fairhills High School. Such creek areas may provide a theme for an extensive environmental education program including active involvement by pupils and teachers in community processes.

The general objectives of the program were to develop attitudes, skills and knowledge so that students see themselves as a functioning part of the local community throughout their lives and have the ability to make objective, rational decisions on community issues.

A study of the area was initiated, data were collected and a plan for approval by the local authorities was produced. Those proposals in the plan which were acceptable to the local authorities were implemented immediately. For example, removal of rubbish and control of noxious weeds. In an effort to gain support for some of its proposals, the school campaigned to increase public awareness and enlist public support.

---

## INTRODUCTION

Blind Creek, in Melbourne's outer-eastern suburbs, has been used intensively as an educational resource since the opening of Fairhills High School in 1973. The creek area features a wide range of environments. Some parts are relatively undeveloped, with an abundance of locally-indigenous plants and animals. Other parts show disruption typical of urbanised areas: water pollution, erosion, weed infestation, cleared or degraded natural vegetation, filled floodplain areas and barrel-drained sections of creek.

Use of the creek during the school's early years followed a conventional subject-oriented approach but a desire developed to play a more active part in preserving and enhancing the area's natural character. It was clear by early 1975 that this desire was incompatible with certain other requirements and proposed uses for the area. These included a trend toward increased clearing of open space areas for reasons of fire control and tidiness, and proposals for further flood plain filling by developers, combined with straightening and concrete-lining of the creek and clearing of creekside vegetation for flood control purposes.

Staff and students subsequently initiated a program aimed at achieving a local land development which retained those features valuable for education and nature conservation. This program was not intended solely to provide educational experiences for students but was also intended to influence community attitudes.

From the outset it was realised that the duration and scope of the program would be dependent upon a number of variables which could not be readily controlled. Particularly important in this regard were:

- the attitudes of groups like parents, school administration, Knox Council and other

*Blind Creek downstream from the school — barrel-drained and cleared of native vegetation*

authorities, local residents and owners of creek land in supporting or opposing the program;

- the strength and duration of student and staff interest in the program;
- the ability of those involved in each stage of the program to provide an adequate grounding on which to base the next stage.

The program has developed into an undertaking of considerable magnitude and diverse character which passes through a different stage of progression each year. Certain environmental concepts regarded as essential for all students are included in the Year 9 General Science course. Other student involvement occurs as the need arises. Participation is voluntary and, depending on the individual's aptitude and interest, may include plant propagation activities, giving talks to schools and other groups, mounting information displays or dealing with correspondence.

## THE SCOPE OF THE PROGRAM

### Stage 1: Data Collection

The anatomy of the creek situation was studied in detail including the following aspects:

*Identification* of plant species, animal species and soil types. This required acquaintance with the concept of classification, development of skills in making and recording observations, using texts and keys, and the referral of difficult material to experts for identification.

*Investigation and description* of the distribution and abundance of the identified elements of the system. This included the use of quadrat and transect sampling techniques, fauna counts, capture-mark-recapture population estimates, vegetation and soil mapping, and indices of foliage cover, foliage height diversity and species diversity.

*Study of inter-relationships* within the system, covering both living and non-living components. Aspects covered included:

- pathways of energy, nutrients and respiratory gases, including food web relationships and the processes of photosynthesis, decomposition, respiration, energy loss and plant nutrition;
- the concept of natural communities and the influence on community type of non-living factors such as soil type, availability of water, frequency of fire and presence of pollutants;
- dependence of wildlife upon vegetation for refuge and reproduction;

- population control mechanisms involving such relationships as those mentioned above, with emphasis on structural, physiological and behavioural adaptations for survival;
- ecological succession and the factors influencing successional changes, with emphasis on man's impact through introduction of alien plants and animals, physical disturbance, pollution of soil and pollution of water.

*Study of catchment drainage characteristics* including the influence of stream course character and catchment character, and the relation of such aspects to flood control.

*Study of water chemistry* including factors influencing aquatic community type, the significance of dissolved oxygen, turbidity and bacterial content, measurement techniques and sources of major pollutants.

*Study of community demands* upon the area. These included attitudes of local residents, community groups and authorities; existing proposals for development, and existing land usage and ownership. Information was obtained through interviews, written enquiries and on-site observation. A series of photographs taken by staff members was used to discuss styles of development in places like floodplains, parks, road reserves and residential and industrial areas. Journals from the Australian Conservation Foundation, C.S.I.R.O., Victorian Natural Resources Conservation League and Victorian National Parks Association were particularly useful sources of topical local information.

*Study of local specialist opinion* concerning possible development alternatives for the area, the feasibility of these alternatives and techniques for their implementation. This involved interviews and correspondence with the Soil Conservation Authority, the Dandenong Valley Authority, the Vermin and Noxious Weeds Destruction Board and University Departments including Environmental Science, Education and Zoology. Individuals from government and other controlling bodies provided information which proved especially illuminating. Communication with such bodies was found to be most appropriately carried out by teachers who reported back to the students.

### Stage 2: Collation of Data, Development of a Management Plan

Information from the study was collated and analysed to produce a comprehensive

*Year 8 English students collecting information from the creek area to use in a 'Nature Journal'*

144

Students clearing blackberries from amongst native vegetation

Students cleaning up the creek

description of the situation and to prepare land management proposals which allowed for conservation of the area's educational value. A preliminary statement based on the study findings was then submitted to the relevant authorities for comment. The description included maps showing the stream course, flood plain, roads, ponds, vegetation types, land use, land ownership and existing proposals for development, flora and fauna lists, an account of threats to the area's natural features, and a description of the area's value for education.

The management proposals which arose from the study were quite extensive. They included:

- setting aside a stream reserve which was to contain as much as possible of the flood plain and a buffer zone of open parkland where isolation from adjacent areas such as housing developments was required;
- essential erosion control and/or drainage control works of a type consistent with the amenity of the area;
- preservation of existing locally-indigenous vegetation and its enhancement through encouragement of natural regeneration and by artificial propagation;
- urgent sewering of the catchment to reduce the severe water pollution;
- preservation and enhancement of vegetation corridors linking the stream reserve to other areas of bushland.

### Stage 3: First Practical Applications

Some proposals in the preliminary report proved immediately acceptable to the Knox Council and the Dandenong Valley Authority which were the main authorities concerned, and the school began their implementation. They required the removal of rubbish from the area, control of noxious weeds and enlistment of the co-operation of owners of already developed land in a scheme for the propagation of locally-indigenous plants. These are on-going activities and equipment and materials are provided by the school.

Unlike rubbish removal and weed control which are carried out partly during lunchtimes, the propagation of plants is done mainly during class time as certain aspects are included in the Year 9 Science curriculum. Students locate, identify, collect and germinate the seed, then pot and eventually plant out the seedlings. Propagating methods to suit local plants and local conditions were devised under the guidance of a staff member experienced in growing native plants, and required a considerable amount of staff and student experimentation.

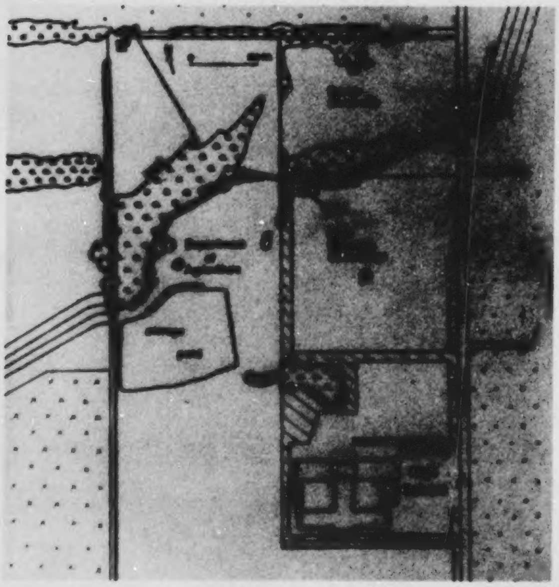
### Stage 4: Creating Public Awareness and Enlisting Support

*A. The need for public support:* Proposals to avoid filling the floodplain and concreting the creek bed were not acceptable to the authorities. A number of other proposals including preservation of native understorey and reed beds, preservation of vegetation corridors linking the area with other bushlands, setting aside of wildlife refuge areas and propagation of locally-indigenous vegetation in areas of public open space were also viewed unfavourably for a variety of reasons. In particular, the authorities did not believe the public to be especially interested in seeing such initiatives taken in a suburban area. Sewering of the catchment was intended but would take many years due to a cut-back in funding.

Student-staff meetings were held to discuss the appropriate course of action to take next. In view of the process by which decisions on land use are made, it was decided that the school should campaign to increase public awareness of the situation and enlist public support for its proposals.

### B. Features of the school's campaign:

1. Publicity materials were developed by students and staff and included photographs of relevant aspects of the creek area, information booklets, illustrations by students of the creek's native plants and animals, colour prints of the creek's animals taken from old magazines and calendars, a script describing the situation and outlining the school's proposals, multiple copies of a petition concerning the school's proposals for the creek, and posters with photographs of the area and appropriate captions.
2. Student talks, using the photographs and script were given to school and community groups. Fairhills' oldest students (Year 9 at that time) spoke to secondary schools while Year 8 students arranged to speak at their former primary schools. Talks to community groups were given at night. On such occasions a staff member accompanied and introduced the students.
3. Displays were prepared by students and staff for mounting in public places. They comprised labelled photographs and illustrations depicting the area's bushland character and its animal and plant life, a locality map, brief background information including flora and fauna lists, an account of 'our views' describing the school's proposals, specimens of the plants being propagated and a description of propagation methods, and handout information sheets. The initial display was held at a major shopping complex near the school and provided an opportunity to collect signatures for the petition. This display proved a resounding success and gave the students considerable confidence in their ability to enlist public support for their objectives successfully. Further displays were mounted following invitations from the Royal Melbourne Show, various native plant shows and the Knox Library.
4. Visits to local residents to discuss the issue were done mainly in evenings. Students worked in pairs and were assigned areas near their homes. Residents were asked to sign the petition.
5. Posters were displayed in shops and other public places.
6. Correspondence describing the situation and asking for support and suggestions was sent to the State and Federal Members of Parliament for the area, the State Minister for Conservation and various conservation organisations. The recipients of the letters were generally very helpful and often went to considerable lengths to investigate the



**LEGEND**

| | |
|---|---|
| ɑ ɑ | *Major stands of vegetation (predominantly locally-indigenous)* |
| ☐ | *Grassed open areas* |
| ▨ | *Major plantings by Fairhills High School (a number of less extensive or less successful plantings are not shown. Australian native gardens adjacent to the school buildings are not shown)* |
| ● ● | *Residential areas (featuring stands of locally-indigenous vegetation in many gardens)* |
| ⁚ ⁚ | *Australian native vegetation planted by State Electricity Commission and Department of Agriculture* |
| x x x | *New industrial estate (featuring Australian native gardens, some planted by Fairhills High School)* |

situation and suggest courses of action. Letters also served to show these bodies that the school's proposals, at least on face value, did appear to have merit in the view of various community groups and representatives. The Society for Growing Australian Plants, for example, offered to assist students with the propagation of native plants and eventually became quite actively involved in this aspect of the creek program.

7. Media coverage included the local press, daily press and television news. Local press reports were based upon interviews and photographic sessions and press releases and initiated through a personal approach of a Fairhills' staff member. Television news and the daily press became involved through mail contact. Students published reports on campaign activities in their own school newspaper and in the school's daily bulletin. Considerable emphasis was given to communication within the school community to encourage awareness that the campaign was a united school effort.
8. School visitors including several local councillors were invited to see the creek and how it was being used, and to discuss the situation. This proved to be an effective way of ensuring that our sincerity was recognised and that our objectives and our methods for implementing these objectives were understood. To foster awareness of the issue and to demonstrate the educational value of the creek area, visits by teachers, student groups and other interested parties (e.g. Melbourne and Metropolitan Board of Works educational staff) were encouraged. The school and the creek area were used as the venue for a two day in-service training course in environmental studies. Excursions from several primary and secondary schools were also arranged.
9. Recognition of the creek program as an educational activity was received. Staff were invited to give papers concerning the creek program at a number of conferences, to become members of various land use planning committees and to prepare reports for publication in newsletters and journals. This type of involvement has provided further evidence to local authorities of the educational value of the area.

### Stage 5: Preparation of a Detailed Report

Once the public awareness campaign had reached an advanced stage, a detailed report on the creek situation was prepared. It contained the descriptive information from the preliminary report as well as an account of certain ecological and educational principles likely to be unfamiliar to those reading the report, a set of management proposals (see Appendix I), evidence of public support for the school's aims, and evidence of the area's educational value.

This report was discussed with the School Advisory Council, and then submitted to Knox Council which resolved to approach the relevant landowners and authorities with a view to preserving Blind Creek 'in its present state'. In addition, negotiations were satisfactorily finalised to allow the school to carry out plantings of locally-indigenous vegetation in appropriate areas of public open space.

### Stage 6: Current Developments and Possible Future Involvement

Certain landowners were reluctant to co-operate with the council in preserving the creek and the support of a local member of parliament was enlisted. Representations by the member proved successful and the council resolved to commence purchase of the necessary land. The future of the area still seems uncertain, however, especially in regard to management of the land. It is expected that this issue will continue to involve the school for a number of years to come. It is also intended to examine adjacent areas in the future. The precedent that has now been set and the expertise developed during this program will hopefully facilitate further school involvement in local development.

## IMPLEMENTATION OF ACTION PROGRAMS GENERALLY

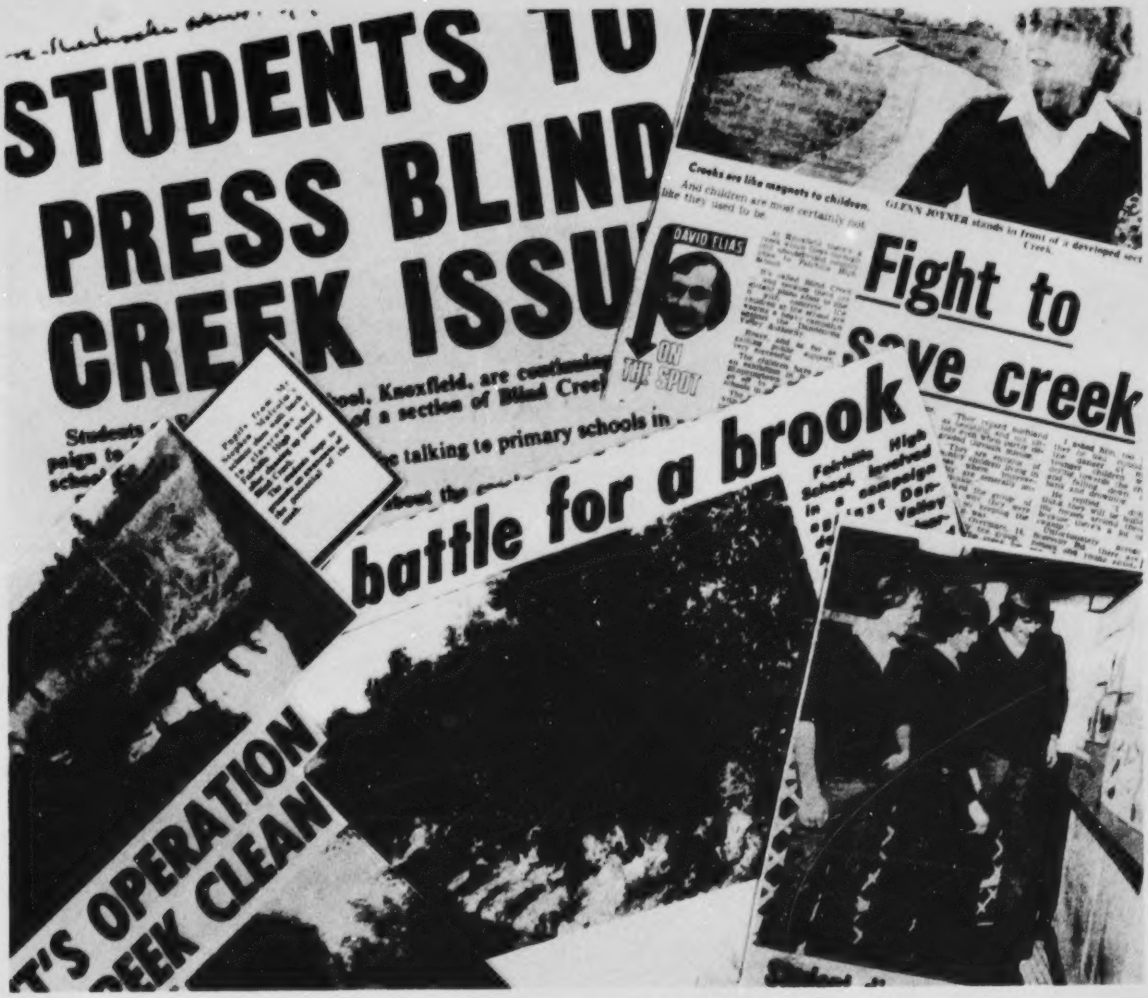
### Planning

It is impossible to map out the overall course of such a program in advance due to the large number of variables which cannot be controlled. Advance planning for many of the smaller steps may be possible and should be attempted, however.

It is best to begin in a simple way with a topic which will serve as a core on which to build. A gradual scaling-up of the program in steady, carefully considered steps is very important in controlling the tendency of such programs to get completely out of hand in regard to school finances, staff time and so on and makes it much easier for the organisers to achieve a level of school involvement consistent with the enthusiasm and capability of those involved.

'Restoration of vegetation' is an appropriate core topic. It can be adapted to suit practically any age group, time span or area size. Activities may range from one day to many years, and small to large, and may involve research into such aspects as natural regeneration, artificial propagation techniques and plant habitat requirements. As

147



STUDENTS TO
PRESS BLIND
CREEK ISSU

Creeks are like magnets to children.

And children are most certainly not like they used to be.

GLENN JOYNER stands in front of a developed sect Creek.

DAVID ELIAS

ON THE SPOT

Fight to S ve creek

battle for a brook

Fairhills High School, involved in a campaign

T'S OPERATION EEK CLEAN

seen in the Fairhills program, such a topic readily lends itself to expansion into many other areas of environmental education such as involvement in community decision-making processes, study of man's impact on the environment and study of multiple land use concepts.

A high level of student and staff enthusiasm is vital to the success of the program. Students, especially juniors, tend to have a short interest span and are easily discouraged by setbacks. They do not change their minds about the desirability of the program objectives but they do change their minds about the part they believe they can or should play in attaining them and so the following factors are worth considering.

*School atmosphere:* A major motivation for students is the feeling of working together with others to achieve a goal they have chosen themselves. To encourage the development of such a feeling, considerable publicity has been given within the school to the progress of the various activities and to the individual students involved in them. This publicity has been achieved through school newspaper articles, displays of photographs and press clippings and reports given by students and staff at general assemblies and in class.

*The media:* Predictably, involvement with television and the press has had a very marked impact on student enthusiasm for the program. Some teachers may be concerned about the ethics of involving media coverage in such a situation but it should be kept in mind that the authorities are required to act in the community's best interests and if any community member or group feels this is not happening, the issue can be resolved by publicising the details of the issue and allowing the community to decide. Fairhills' major apprehension was that the media might not give a fair or accurate account of the situation. Such fears have proven unfounded.

Students may need some preparation before contact with the media. Even those students with the greatest insight into the issue had difficulty conveying their feelings when interviewed. It may be worthwhile to have a class exercise where someone acts as an interviewer, asking the type of questions likely to be encountered. The students who will represent the school in press and TV interviews can answer and the class can judge the quality of the response.

*Timing:* Once students have decided upon the need for active involvement, it is important that the initial data collection stage should not extend for too long, otherwise the students' initial enthusiasm may begin to wane due to an apparent lack of action.

*Use of the school's grounds:* Inclusion of the school's grounds in the scheme for preservation and enhancement of the creek area's natural atmosphere has proven very valuable in maintaining student enthusiasm. Being completely under school control, the grounds have not been affected by many of the problems encountered when public open space is involved. With thousands of rapidly growing new plants, honeyeaters visiting for the first time, two newly-created ponds and an absence of the previously thriving blackberries, the grounds are a constant reminder to students of the success of their efforts.

*Contribution of ideas:* A project such as this needs to be frequently reviewed with the students as new developments occur. This helps them to see that the program is making progress and is important in helping them to comprehend what can be a fairly complex situation. After each review ask for suggestions on 'how to proceed from here?'. It is vital that students are, and see themselves as, major contributors.

There are many things that students just cannot do themselves. If such a program is to succeed, teachers must become deeply involved. It is important that the students see their teachers' involvement for this helps them to view the program as being of real importance. And there will be times when students have contributed all that they can and where further progress depends completely upon staff enthusiasm and ability.

## Choices of Action

There will be many situations where a decision must be made on how much should be done by the students and how much should be done by the teacher. Such decisions will be influenced by factors such as availability of time, the age and abilities of the students and the nature of the activity. For example, it often takes much more time to arrange for students to successfully carry out activities like drafting a letter, designing a display or researching a potential management technique than it does for the teacher to do them. Naturally, students should be encouraged to do as much as possible themselves.

Situations will arise where there are a number of alternative courses of action from which to choose. Should the proposals to Council be far reaching and therefore potentially at risk, or should they be safe and conservative even if far from ideal? How is the media best used so that public scrutiny is obtained without alienation? Within the constraints of time and resources how are priorities for tasks established?

Whether or not correct decisions are made will depend on many things. Particularly important will be the ability of the staff involved to recognise all the options available in the first place. An understanding of the workings of the community with respect to planning and decision-making processes is critical, as is the need to establish working relationships with a wide variety of people.

## Decision-making Skills

If students are to be actively involved in influencing community decisions, they must be helped to develop attitudes and skills related to decision-making. This involves an ability to recognise all reasonable alternatives and to carefully and critically evaluate the evidence supporting each alternative. It also involves a recognition of the dangers of not following such a procedure. Teachers have a significant role in this whole process.

Initially, students are likely to form an opinion in favour of bushland and wildlife preservation without giving much thought to other possible viewpoints. It is the teacher's role to detail all relevant facts and to encourage objective decision-making. Extreme examples can be used to point out the risks involved in hasty decision-making. The group can then begin a detailed analysis of all the points of view involved. They can consider the validity of suggested costs and balance the costs with the benefits. Once students ask questions of the kind 'is it worth losing this to gain that?' they should become aware of the significance of individual values in decision-making. They should also become aware of the importance of specialist opinion and accurate, comprehensive information.

## School Support

School administration and advisory council support is very important to such a program, for these are the avenues through which statements of school attitude are made. Financial assistance is required to provide things like photographic materials, stationery, postage, tools and plant propagation materials. Co-operation is required to enable implementation of those activities which are not suited to conventional class sizes or period lengths. Because involvement may be so time consuming for teachers, co-operation in time-tabling is very necessary. In particular, non-teaching periods are needed to enable organisation and supervision of volunteer groups which may come from a number of different classes to make contact with the authorities, press and community groups, and to research the various issues involved.

## Dealing with Local Authorities

*Variations in attitude:* Impressions with respect to the acceptance of a proposal by authorities may be misleading. Be prepared for setbacks in this regard. Changes of opinion, changes in council membership and various personnel changes can occur while details are being finalised. While the level of publicity is high, an authority may agree with proposals or agree to study the situation but postpone doing anything definite for twelve months or so. When the publicity has died down, the authority may reaffirm its objections to the proposals.

*Involvement of community groups:* It is wise to try to involve other appropriate community groups. Authorities are more likely to endorse a program if the school can demonstrate it has widespread support.

*Expert endorsement of proposals:* The credibility of a proposal submitted to a public authority may be considerably increased by obtaining the endorsement of a well-known expert in that field. Providing the expert believes the recommendations to be sound, endorsement is likely to be given.

*Establishing credibility:* Authorities are sceptical of proposals where there is no direct evidence of their feasibility or of the school's dedication to implement them. Several years of sustained effort within the Fairhills grounds in implementing the types of proposal made for the creek area itself is seen as a major factor in demonstrating to the authorities the feasibility of the school's proposals.

*Variations in teacher expertise:* Some teachers may be uncertain of their competence in various areas of a program like this. In such a situation or whenever necessary, teachers should not hesitate to seek independent expert advice.

## Organisation

Organisation of the wide range of activities involved requires a variety of approaches.

*Small groups:* Effective planting and maintenance activities may be difficult to organise at the class or subject level. Lack of sufficient equipment is one main reason for this. Usually, small groups of students with half a day or more to spend are the most suitable. This approach is especially appropriate in catering for students not suited to conventional academic activities. A number of students regarded as difficult to teach in class have proven responsible, hard-working and eager to learn in various practically-oriented creek program activities. In such circumstances, staff interaction with students can be on a much more personal basis, in a situation where the student does not feel compelled to conform.

*Class-sized groups:* There are also many activities which are suitable for involving a full class and which readily fit into a particular subject curriculum. At Fairhills, science classes in Year 9 include activities ranging in length from the usual single period to special half-day excursions. They involve things like flora and fauna surveys, attitude surveys, seed collection excursions and mass tree plantings. Classes may sometimes be divided into two groups, where one group does assignment work on appropriate topics using class sets of materials, while the other group is involved in practical activities. The groups can alternate with these different activities.

*Allowance for age and ability:* The character of the Fairhills program should be viewed in the context of Year 7-10 students, these being the main age group involved. This influences the way teachers approach the program with respect to choice of activities, choice of methods for maintaining student enthusiasm, and the amount of assistance given during activities.

## Varying Involvement

In the general program description given here it has been very difficult to convey the large variations which occur in the intensity of involvement of students and staff. For a considerable proportion of the time, involvement in the program is very low key. The only noticeable differences in normal school activities may be things such as a few students potting seedlings down by the west fence. The project is rarely a major topic of discussion in the staffroom but may feature in the conversations of those teachers involved with it at the time.

At certain stages however, there has been intensive activity involving large teams of students digging holes, clearing blackberries, carrying rubbish back from the creek for disposal and so on. There have been trailer loads of plants coming and going, truck-loads of soil arriving, bulldozers digging ponds and frequent PA announcements calling staff to meet visitors or take telephone calls about the program. At times there have been reporters, TV crews, Dandenong Valley Authority engineers, local councillors, groups of students from other schools and various other visitors wandering about the grounds.

## Diversity of Creek Areas

In planning the use of an urban creek area it is very helpful to bear in mind that a key factor in its appeal and educational value is the highly diverse nature of the situation. Notable features include:

(i) diversity of terrain (bumps, dips, ridges, gullies, mounds, bends in tracks, etc.);

(ii) diversity of substrate (grass, bare earth, leaf litter, rocks, fallen timber, mud, etc.);

(iii) diversity of visual perspective (highly variable visible distance: e.g. thick scrub, overhead canopy, grassy clearing, sudden vista);

(iv) diversity of objects available for perception (size, shape, colour, texture, behaviour, odour, sound);

(v) diversity of social interaction (meeting places suitable for groups of varying sizes and varying moods can be found, innumerable games for younger students can be devised in such a diverse environment, etc.);

(vi) diversity of factors affecting the ecological balance of the creek system (soil types, topography, hydrology, types of plants and animals, climate, human influences, etc.); and

(vii) diversity of factors from within the local community which affect the way in which the area is used and developed.

Such a diverse environment provides a very wide scope for the development in students of educationally desirable characteristics. These range from physical co-ordination, powers of perception and knowledge of natural phenomena through to appreciation of natural beauty and respect for living things.

## EDUCATIONAL OUTCOMES

Briefly, the general objectives for the program have been that it should contribute to the development of attitudes, skills and knowledge such that students will see themselves as a functioning part of the local community and that throughout their lives they will demonstrate an environmentally responsible attitude and willingly and confidently participate in matters of importance to their community. In this participation they should demonstrate an accurate awareness of the character of their environment, adequate understanding of the processes (both social and biophysical) affecting their environment and an ability to make objective, rational decisions on community issues.

The school believes that from the very nature of the Blind Creek program it is possible to predict fairly confidently that the program will make a worthwhile contribution towards the development of these characteristics. Thorough assessment of the extent to which this is achieved seems beyond the capability of the school, particularly in regard to the behaviour of students in later life. Assessment is confined to in-school situations, although it is hoped to trace some ex-students previously involved in the creek program, in an attempt to evaluate their current attitude to environment matters and their level of involvement in community affairs.

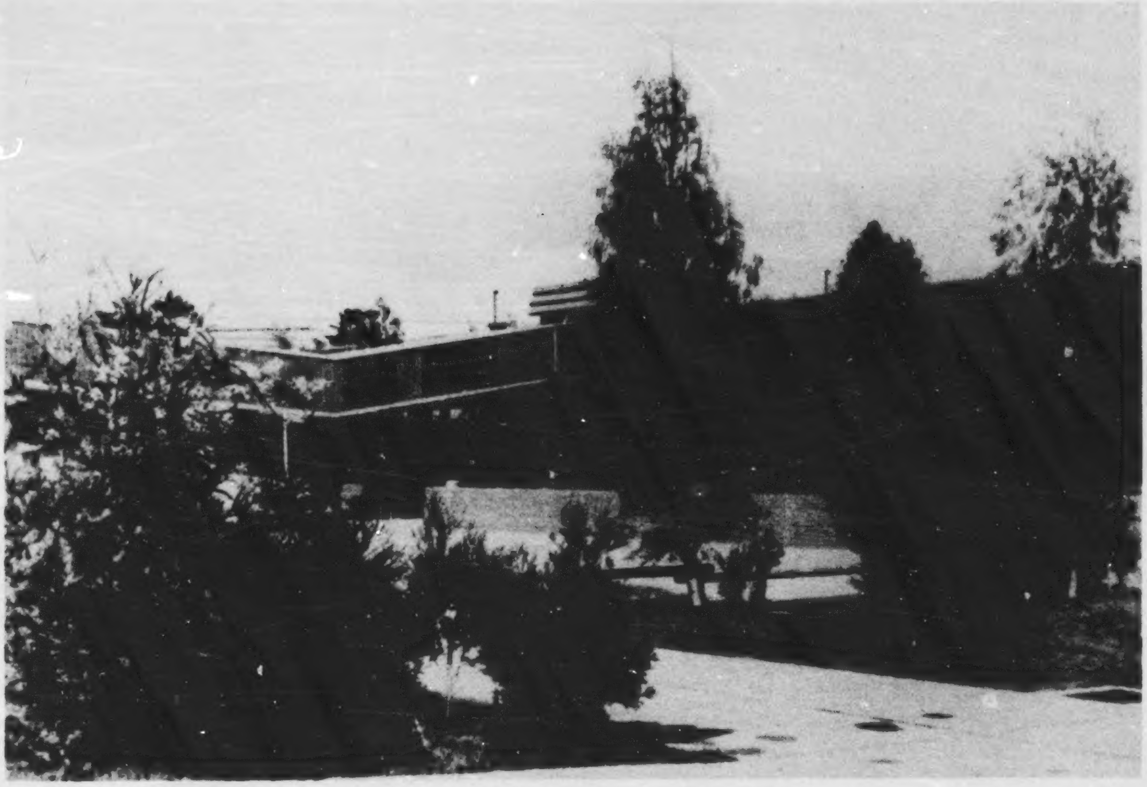
Even within the school situation, assessment is difficult. Although it is apparent that during their time at Fairhills many students do develop considerably in regard to the characteristics aimed for, it is difficult to decide how much of this development is directly attributable to the creek program. Various other formative influences would undoubtedly also be acting. So far, a rigorous overall assessment of program outcomes for students still at school has not been attempted. This is due partly to the probable disadvantaging of students needed as a control group and partly to the large amount of time needed to design and implement an assessment procedure suitable for such a complex situation.

There is, however, some evidence available. It is clear that many students already have strong attitudes on matters like conservation of bushland and animal life when they first join the school. However, these attitudes are often based on a very unsophisticated view of the environment. Environmental skills are usually not well developed. Staff opinion is that environmental attitudes and understanding of environmental processes do develop markedly at Fairhills. Students involved in the program have become more involved in community matters such as the creek publicity campaign and local beautification activities.

One aspect that is objectively assessed is the development in understanding of basic environmental concepts during the Year 9 science course. Most students assessed have shown marked development in this regard.

## CONCLUSION

Urban creeks may be the only areas with a semblance of natural conditions which are easily accessible to urban schools. Such areas may provide a theme for an extensive environmental education program, including active involvement in community processes. It is suggested that such active involvement can help students to see



One of the school courtyards three years after planting by students

One of the artificial ponds created amongst the school's only mature vegetation

themselves as a functioning part of the whole community and can encourage a desire to play a constructive part in the development of that community. Active involvement should be based upon a belief by students that they are doing something which is not just designed to educate them but which is intended to have a valuable effect on their environment.

In some respects, a small amount of disruption through human influences adds to the educational value of such areas. Unfortunately, extreme disruption through modern engineering practices, lack of pollution control and the like are rendering an increasing number of these areas educationally worthless. Those areas not yet severely disrupted and those suitable for restoration should be seen as valuable for the pursuit of a wide range of educational objectives.

## ACKNOWLEDGEMENTS

For assistance with the preparation of this manuscript, I wish to thank Mr Jim Wilson, Mr Neil Newnham and the numerous Fairhills High School staff members who made helpful suggestions. Thanks are also due to Mrs F. Malcolm for typing the original manuscript.

## APPENDIX I

### Management Proposals for the Blind Creek Area

Prepared in consultation with Dr E.H.M. Ealey, (Co-ordinator of Environmental Science, Monash University)

### A. General Recommendations

The following approach is recommended in order to ensure conservation of the creek area's educational, recreational and aesthetic values. This approach takes into account the resources of labour, plant stocks and expertise available through Fairhills High School and the Society for Growing Australian Plants (S.G.A.P.)

1. A stream reserve should be established which allows for protection of existing features of value and for further enhancement to enable realisation of the area's full potential. This reserve should contain as much as possible of the valley's floodplain. Such land is less suitable than most for residential development and current stream management theory advocates the avoidance of filling of floodplains. Valuable features on adjacent higher land should also be considered for inclusion in the reserve. Where it becomes necessary to isolate the stream reserve from conflicting adjacent land uses (e.g. roadways, residential areas) a buffer zone at least 25m wide should be established. The buffer zone could be developed as a strip of open parkland, providing users with an alternative to the bushland atmosphere of the stream reserve.

2. Requirements for drainage, safety and erosion control should be met through methods consistent with the amenity of the area. For example, obvious artificial features such as a straight stream course, graded surfaces, concrete channelling, mown grass, garden-style shrubs and large cleared areas should be excluded from the stream reserve. The Dandenong Valley Authority believes this to be possible as long as a sufficient amount of floodplain is preserved.

3. Existing locally-indigenous vegetation, particularly mature trees (which take many years to replace), should be preserved wherever possible.

4. Present features of value such as wildlife and bushland atmosphere should be enhanced through:
   - (i) Re-vegetation of areas which are presently devoid of bushland vegetation, using appropriate locally-indigenous plant species (taking into account resistance to Cinnamon Fungus, *Phytophthora cinnamomi*).
   - (ii) *Gradual* replacement of alien plant species with appropriate locally-indigenous species (gradual because some alien species (e.g. Blackberry), presently provide important shelter for wildlife).

Note:
- (a) Re-vegetation could best be carried out through encouragement of natural regeneration, supplemented by artificial propagation.
- (b) Special consideration should be given to areas subject to heavy usage and plant species such as *Acacia verticillata, A. armata* and *Leptospermum juniperinum* (all tough and prickly) should be used to buffer more sensitive areas from damage.
- (c) Removal techniques for pest plants should be carefully chosen to suit each particular situation. In general, selective removal (e.g. with hand tools) is preferable to large scale removal with machinery. Use of pesticides should be avoided if possible.

5. Definite pathways should be established to discourage unnecessary trampling of vegetation.
6. Fallen trees or limbs of trees, and trees which are dead or partly dead, are ecologically valuable. They should be retained unless posing a significant danger to the users of the area of adversely affecting the function of the waterway.
7. The catchment should be adequately sewered as quickly as possible. Residential run-off is the main cause of the presently existing water pollution. The very low summer flow rates expected after sewering will not prevent the establishment of a diverse and educationally valuable aquatic life system as many aquatic organisms are adapted to survive summer dryness.
8. Fire control will be provided by the buffer zone around the stream reserve. Clearing of undergrowth and long grass should be kept to an absolute minimum within the stream reserve.
9. In order to ensure the viability of wildlife populations, appropriate areas of vegetation should be designated as refuge areas and human entry to these areas discouraged (e.g. no paths, borders of thick vegetation or swamp). Areas currently serving a refuge function might be eventually required for other uses (e.g. route of walkway). Establishment of a replacement refuge area nearby would allow eventual usage of the original refuge area for other purposes without any detriment to wildlife. The re-vegetation program proposed for the creek reserve should be commenced as soon as possible so that replacement areas will be available for any vegetation removed during subsequent development (e.g. walkways, S.E.C. terminal station, Blackberry removal operations).
10. The farm dam is especially valuable. If it cannot be retained, a new one should be constructed in a suitable position as soon as possible. If practicable, further small ponds and swamps should be created along the creek course. This would lead to an increase in the abundance and diversity of wildlife and could be useful in isolating areas of vegetation for use as refuges.
11. Certain native bird species which might be expected to occur in such a habitat are absent (e.g. Grey Fantail, Yellow Robin). This is likely to be due to the restricted amount of vegetation available (particularly thick undergrowth). The vegetation should not be reduced further for risk of the disappearance of further species. Extension of the vegetation should make the area suitable for a number of species currently absent.
12. Valuable vegetation occurring outside the stream reserve and buffer zone should be retained if possible through arrangement with landowners or special town planning zoning requirement. Future planting of appropriate vegetation on adjacent properties should be encouraged (e.g. through donation of plants for home gardens and industrial sites).
13. Future flooding of the proposed stream reserve, if it were to occur, should not be regarded as detrimental. Occasional flooding is a natural occurrence for animal and plant species indigenous to the area.
14. The pedestrian walkway proposed by Knox City Council in conjunction with the Open Space Zoning (City of Knox, 1972) should be regarded as important in allowing the community to obtain maximum benefit from the area. The type of walkway constructed should be in keeping with the natural character of the area and as far as possible should be routed through the park-style buffer zone.
15. Due to the limited extent of the bushland area near Blind Creek and considering the parking, sporting and toilet facilities already in existence further upstream at Fairpark, it is proposed that should sufficient demand develop for picnic facilities, they be sited at Fairpark, from where picnickers can visit the bushland. It is suggested that such a picnic area be vegetated so as to create a semblance of continuity with the bushland. Further, this continuity concept could be beneficially applied to the creek course as a whole, both upstream and downstream from the bushland area. Fairhills High School and the S.G.A.P. are able to provide considerable assistance with such a planting program.
16. Management of the creek area should be carried out through a committee which includes representatives from the Knox City Council, the Dandenong Valley Authority, the Fairhills High School/S.G.A.P. group and the Department of Agriculture.

Note: At this early stage only limited dialogue has occurred between parties concerned with the creek area (viz. D.V.A., Knox City Council, local schools, S.E.C., Department of Agriculture, S.G.A.P., M.M.B.W.) For this reason, recommendations have been made in a generalised form. Details such as the exact routing of the walkway and the exact location of stream reserve and buffer zone boundaries could best be determined through subsequent negotiation.

### B. Vegetation Corridors

The vegetation corridor concept proposes that wherever possible areas such as creeks, roadsides and fence-lines should have a more or less continuous corridor of vegetation along them. This vegetation should be of a type suitable for the migration, shelter and food requirements of indigenous wildlife. These corridors are intended to link presently isolated patches of bushland with each other and ultimately with the bushlands at the perimeter of developed areas.

The value of such a corridor system has already been detailed elsewhere (e.g. Seddon, 1974).

A major benefit is that small, otherwise isolated patches of vegetation such as occur in school grounds or home gardens will be accessible to those wildlife species which are nomadic, migratory or which are only able to breed in the larger, more naturally vegetated areas. For example, areas devoid of vegetation provide a barrier to the movement of many of the native bird species found in our local bushlands (e.g. Blue Wren, Yellow Robin, Grey Shrike-Thrush). Such species readily frequent home gardens adjacent to bushland. In the words of architect and Box Hill Councillor, Howard Hodgins *(Ringwood-Croydon Mail,* 22.10.75) a vegetation corridor system, if widely adopted, would '. . . bring the bush virtually to the back door of tens of thousands of people living in densely settled residential areas . . .'

The corridors themselves add considerably to the total area of habitat available to wildlife, without taking up large blocks of land which could be utilised for other purposes. Space for strips of vegetation is frequently available, especially in areas developed for large-scale land use such as recreation reserves, schools and factories.

Such corridors enhance the beauty of an area and provide relief from winds and high temperatures.

A large, continuous gene pool, rather than a number of smaller isolated pools is of great importance to the long term viability of both plant and animal populations. A corridor system gives the maximum possible continuity in developed areas.

The wider vegetation corridors, such as might occur along creeks and reserves, are regarded as providing ideal routes for pedestrian walkways (e.g. Brotchie, 1974). Suitability would depend upon corridors being sufficient in extent and continuity to allow each person adequate access to community facilities, residences of friends, etc. without recourse to road travel.

The opportunity exists to preserve and enhance existing vegetation which forms a corridor along Blind Creek between the Ferntree Gully National Park and the Dandenong Valley Metropolitan Park (D.V.M.P.) Enhancement of this corridor (presently used by migratory birds such as the Sacred Kingfisher and Olive-backed Oriole) would be of great benefit to the wildlife of the D.V.M.P. and the bushlands and gardens along the creek course. Numerous smaller corridors extend along roadsides, fence-lines, etc., linking the creek corridor with residential areas, schools and parks.

### References Cited

Brotchie, J.F. 'Some systems concepts for urban planning'. *Royal Australian Planning Institute Journal,* April, 1974.

City of Knox. *Open Space in the City of Knox,* 1972.

Seddon, G. Keynote Address. 'Forum on Roadsides and Conservation', Burnley Horticultural College, 16 November, 1974.

# *AN INTEGRATED FIELD STUDY IN A CONTRASTING ENVIRONMENT*

*Warren L. Pollard*

---

**PREAMBLE**

In this article, Warren Pollard outlines briefly several important aspects of the planning and implementation of a five-day, integrated field trip to the Warrumbungle Mountains by Year 10 students from Cobar High School. He focuses particular attention on the role of informal discussion as a means of attaining support and co-operation from the whole staff and ensuring that the maximum of subject integration occurs. Sample worksheets, contained as an appendix, indicate the types of integration that can be achieved.

---

## C. IN THE FIELD

### INTRODUCTION

Cobar is a town of 3500 people situated on the flat western plains of New South Wales, some 700 km west of Sydney. It has a harsh climate; the closest stream or river is over 100 km away so that even water must be piped 210 km from the Macquarie River at the town of Warren. The staff of the Social Sciences Department at Cobar High School were concerned about the needs of the students in terms of the impact of the harsh, flat environment, the isolation and insularity, and the general social education of secondary students. A field study/excursion policy covering Years 7-10 had been accepted by the school so the Warrumbungles study made an ideal Year exercise. The project was initiated and co-ordinated by the Social Sciences staff but considered as a school integrated field study.

### TEN SUPER REASONS

What was hoped to be achieved by the study?

(1) *Group Dynamics Exercise:* Most of the students would soon be entering the workforce where they would be required to co-operate with others. It was thought that people in all walks of life have the need to understand group pressures.

(2) *Exposure to a Different Environment:* Cobar students live in a semi-arid environment on the western plains, whereas the Warrumbungles with rugged terrain and lush vegetation present a marked contrast.

(3) *Extend the Students in their Physical as Well as Mental Capacity:* Schools too often fail to allow students to explore their physical limitations.

(4) *Give Experience in the Bush.*

(5) *Enjoy Fellowship at the End of their Formal Education:* For most students Year 10 is the end of school and end of long established friendships.

(6) *Better Staff/Pupil Relationships:* The informal nature of the study allows both students and teachers to gain a better understanding of each other. This should allow easier transition to senior work for those students going on to Year 11.

(7) *Give Some Meaning to Classroom Learning.*

(8) *Break Down Some Barriers Created by Subject Empires.*

(9) *Show that Learning is not Confined to a Series of Subject Boxes:* This could be achieved by using the Warrumbungles as the integrating force for various subject contributions.

(10) *Develop an appreciation and feeling for the Warrumbungles.*

Some idea of the planning needed for the project can be seen in the operations flow chart. Careful planning was essential if students were to receive maximum benefit. It was also necessary to ensure the staff co-operation on which effective integration depends. Consequently, a detailed proposal was prepared for submission initially to a meeting of subject masters and subsequently to the whole staff. This proposal set out the major aims of the project, the venue, the duration, accommodation arrangements and costs. Time was also spent prior to these meetings discussing the project with staff on an informal basis. While time-consuming, this did ensure that staff understood what was intended and were able to offer constructive criticism. Because most key areas had been covered in informal discussion, the project was endorsed at both meetings and volunteers readily came forward to prepare units and co-ordinate work prepared by a subject area. At the general staff meeting the following outline was issued to all those present.

**SAMPLE STAFF OUTLINE**

**Integrated Field Study — Preparation of Work Units**

One of the aims of this trip is to develop a study program taking account of as many subject disciplines as possible and covering as much as possible of the four years of secondary schooling. It is not intended to give separate subject work but rather to integrate subject areas into a single work unit containing focus questions, work sheets or other elements relevant to the particular area being studied.

This approach means that subject teachers will be required to set down work suitable for the different walks that are planned and on display in the Common Room. The booklets 'Warrumbungle National Park' are of great value in preparing these work units. When these units have been prepared they should be given to the co-ordinator so that integrated work units can be prepared for use in the field. So that these final units can be prepared it is requested that units be in the hands of the co-ordinator by *19th August at the latest.*

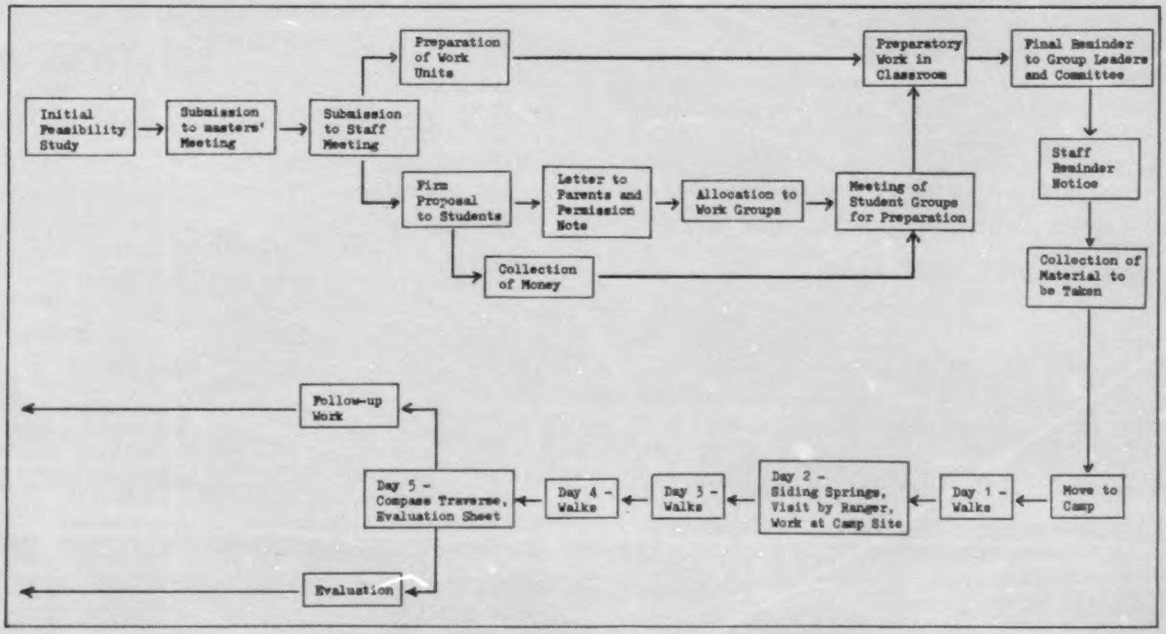
Activities that suggest themselves for inclusion in an integrated study are:

1. map reading and compass traverse
2. geology
3. landform study
4. animal and bird life
5. vegetation
6. survey techniques
7. art appreciation
8. appreciation of poetry and English expression
9. history — empathetic as well as traditional
10. organising food and cooking
11. ecological study.

Work could be recorded either as individual effort or as group reports.

To ensure the success of the field study and to maximise learning processes each subject area should ensure that suitable *preparatory work* is carried out in the days prior to the actual field study and that *follow-up work* in the days after the unit consolidates all that was achieved in the field.

It is intended to take a small library and suggestions of books to include would be appreciated. Suggestions for wet-weather activities would also be useful.


Initial Feasibility Study
Submission to masters' Meeting
Submission to Staff Meeting
Preparation of Work Units
Firm Proposal to Students
Letter to Parents and Permission Note
Allocation to Work Groups
Meeting of Student Groups for Preparation
Collection of Money
Preparatory Work in Classroom
Final Reminder to Group Leaders and Committee
Staff Reminder Notice
Collection of Material to be Taken
Move to Camp
Day 1 - Walks
Day 2 - Siding Springs, Visit by Ranger, Work at Camp Site
Day 3 - Walks
Day 4 - Walks
Day 5 - Compass Traverse, Evaluation Sheet
Follow-up Work
Evaluation

It was imperative that as many teachers as possible were involved in the organisation of the study. Involvement meant commitment, even in an indirect way. It was hoped this commitment would in turn be communicated to the students and would create a greater understanding of the aims of the project. This should have impact not only during the preparatory and follow-up work in the classroom, but also in the general attitude towards co-operation between subject areas in the total school curriculum.

The final work units were organised to suit the different trails to be taken by each group. It should be pointed out that contributions from some teachers was in a form other than units of work. For example the home science teachers assisted students to plan meals, the Music teacher made up a booklet of camp fire songs and the physical education teacher trained two students in each group in first aid.

## STUDENT BRIEFING

As well as individual units of work for separate trails (see Appendix I) there were sections of a more general nature applicable to each day. One such section is shown below:

*All Trails* (Issued Day One)

This is one of Australia's finest national parks. It will be used by countless future generations and so you have a responsibility towards these future generations to preserve this park in as close to natural condition as possible.

So:

1. *Do Not Litter* — any rubbish, whether it be a tissue, a can or small pieces of lolly paper, is to be placed in your pocket or bag to be disposed of later. Take a small plastic bag on your walks to use for litter.
2. *Do Not Destroy the Natural Environment* — do not break trees or shrubs or trample down the undergrowth. Keep to the paths.
3. *Do Not Disturb the Wildlife.*
4. *Obey the Rules of the Park.*

*A. ART NOTES*

- You are only interested in your reactions, both visual and emotional, to the environment.

**ELEMENTS OF THE ENVIRONMENT**

1. The environment is vastly different from Cobar, incorporating terrain created by volcanic eruption. Cores still remaining and also Basalt cliffs show the familiar pillars created by COLUMNAR JOINTING.
2. Vegetation is more dense, greener and damper in the mountains. Crops are grown on the flats, with occasional basalt formation in the middle.
3. There is an abundance of varied bird and animal life. Running streams.
4. Earth colours, rock colours and vegetation all differ from Cobar.
5. The accommodation is different from your home.

Therefore your reaction to the Warrumbungles will involve different sights, sounds and scents from those of Cobar. Your feelings about the Warrumbungles should be different from those about Cobar.

You should be able to set down your reaction to the Warrumbungles environment visually as well as verbally, (that is in paint or pencil as well as with words) to show some aspects of the above five elements of the environment.

## INTEGRATED STUDIES

Each trail unit included sections on ecology, geology, vegetation, map reading, aspects related to poetry and English, soil and mathematics (judging height of trees, distance etc.). Whilst these units were being prepared by the co-ordinator, the students in class were presented with preparatory work in each subject area. Students were to be involved in three different groupings: Activity Groups, Study Groups and on The Camp Committee. The Activity Group and the Camp Committee meant involvement prior to the trip as well as at the camp. It can be seen from the listing of tasks set out below that the groupings were carefully planned to allow for the implementing of some of the aims set for the field study.

**SAMPLE**

**ACTIVITY GROUPS**
**COBAR HIGH SCHOOL**

**INTEGRATED FIELD STUDY: WORK GROUPS: WARRUMBUNGLES**

Year 10 has been divided into 6 Activity Groups as shown on the attached sheet.

1. *ACTIVITY GROUPS*

Groups will be activity groups responsible for the following:

a. ordering and planning food for the five days of the camp with the exception of two nights when barbeques will be organised for all students.
b. obtaining sufficient pots, pans, washing utensils etc. for cooking of food and cleaning up.
c. obtaining a gas stove for cooking food.
d. taking plates, cups and cutlery.
e. preparing lunches and drinks for the day's activity.
f. carrying out general duties around the camp as detailed by the Camp Committee.

g. election of a group leader who will also be the group representative on the Camp Committee.

h. where group reports are required then the group as a whole is responsible for completion of these reports.

Each Activity Group includes one girl studying home economics who will be able to assist in planning many of the above tasks and one boy trained in elementary first aid.

2. *STUDY GROUPS*

Each day students will undertake field work in Study Groups as follows:

Study Group A — Activity Group 1 and 4
B — Activity Group 2 and 5
C — Activity Group 3 and 6

The programme for Study Groups is as follows:

| *Day* | | *Study Group* | | |
|---|---|---|---|---|
| | | *A* | *B* | *C* |
| 1 | trail | 1 | 3 | 4 |
| 2 | Siding Springs; ecology study; quadrat study | | | |
| 3 | | 3 | 4 | 1 |
| 4 | | 4 | 1 | 3 |
| 5 | Compass traverse for all groups | | | |

Trails have been marked on the key map and will be on display at the camp.

3. *CAMP COMMITTEE*

The camp committee will be responsible for the following:

a. preparing a roster for Activity Groups to carry out the necessary tasks to keep the camp clean; ensuring that the fire is alight before breakfast and at night and any other tasks that the committee considers necessary;

b. welcoming the Park Rangers when they visit and ensuring that students are punctual for evening activities;

c. organising the two barbeques;

d. ensuring that equipment is returned and correctly stored;

e. ensuring the general smooth functioning of the camp.

## STUDENT INVOLVEMENT

Whilst the three teachers chosen to accompany the students on the trip were willing to give advice or become involved when students met difficulties in their planning or sought out guidance, the teachers' role was deliberately kept in the background so that students were encouraged to take a more positive attitude concerning their own tasks. This approach carried over to the camp itself when Activity Groups needed to allocate work to ensure food was cooked or any of the other menial tasks had to be done. It was usually by the end of the second day that relations within the group became somewhat strained because of allegations of laziness or thoughtless acts on the part of one or more individuals. It was at this stage that teachers initiated discussion sessions to explore the need for co-operation between members of groups and how the group might be able to meet the needs of the individual. These discussions were guided into wider areas with special emphasis on man's responsibilities in terms of the environment whether in a national park or the wider concept of 'spaceship earth'.

## OTHER PLANNING

This included an *information sheet for staff* setting out general details to be observed or undertaken during the camp, a *reminder list for group leaders* to ensure they had arranged the basic items for their group, and a *list of equipment* needed for the exercises set out in work units. In each case these sheets were intended to be backup systems to ensure basic requirements were dealt with either before the camp or during the period of the camp.

Another important part of the planning was an *evaluation sheet*. Students were given this sheet on the last day of the field study. They were asked to go to a quiet spot and think out the answers. Students were not compelled to place their name on the sheet. The mathematics master carried out an item correlation test on the sheets to assist the final evaluation. This sheet, together with teacher responses, was used as the basis for changes in future field studies.

## POINTS TO PONDER

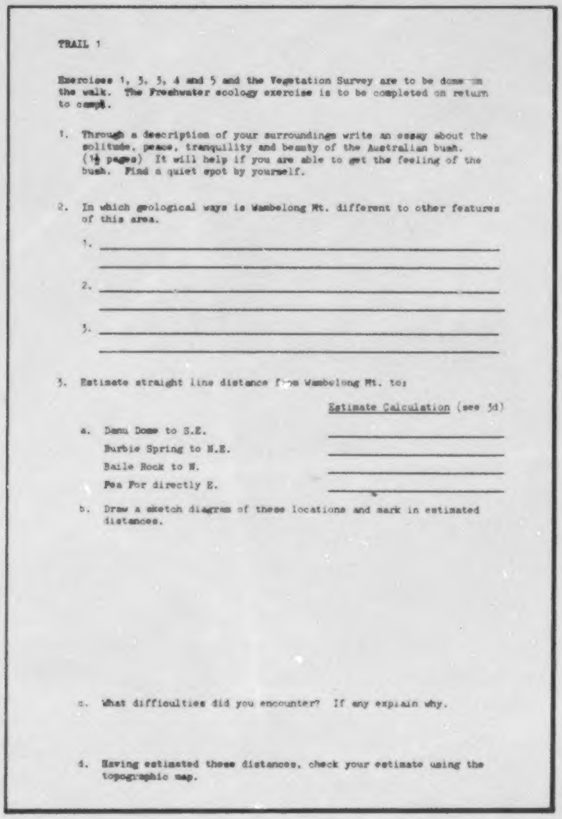
- A normal subject oriented field study is often successfully undertaken with but superficial planning. An integrated multi-faceted field study requires a great deal of planning and a very definite understanding about what is hoped to be achieved by the students.
- To ensure the co-operation of other subject departments and of key decision-makers in the school, it pays to take time to talk to as many colleagues as possible on a one-to-one basis, carefully explaining benefits to the students and details of the operation.
- A critical aspect to ensure a successful exercise is the choice of staff to go on the field study. They must be committed to the aims of the study and between them be able to face any problem or contingency that may emerge. Above all they must have a feeling for such an environment and be able to communicate it to the students — and be fit!

- The co-ordinator will be the key person in organising the study and in developing the right degree of enthusiasm on the part of the staff.
- Though not mentioned above, the Department of Parks and Wildlife Rangers at the Warrambungles were very helpful and if available for other areas they should be contacted well in advance to allow the necessary preparation of talks, films or special interest topics.
- Communication is vital to facilitating a smooth operation. A flow of information must be maintained in both directions between those preparing units, staff going on the trip, students, parents, principal and co-ordinator. The evaluation sheet and debriefing of staff form elements of this communication for the next round of the field study.
- Remember Murphy's law: 'whatever can go wrong will go wrong'. With that in mind you will be conditioned for any eventuality and hopefully be able to cope with the problems that are sure to emerge.

## APPENDIX I: SAMPLE WORKSHEETS

Subject departments contributed work to the co-ordinator who undertook to arrange work as appropriate for each day.

Work was completed on the trail or at night. The aim was to make sure there was enough work so that all students covered the basic core and that there was sufficient to extend the more able student.



TRAIL 1

Exercises 1, 3, 3, 4 and 5 and the Vegetation Survey are to be done on the walk. The Freshwater ecology exercise is to be completed on return to camp.

1. Through a description of your surroundings write an essay about the solitude, peace, tranquility and beauty of the Australian bush. (1½ pages) It will help if you are able to get the feeling of the bush. Find a quiet spot by yourself.

2. In which geological ways is Wambelong Mt. different to other features of this area.

   1. ____________________

   2. ____________________

   3. ____________________

3. Estimate straight line distance from Wambelong Mt. to:

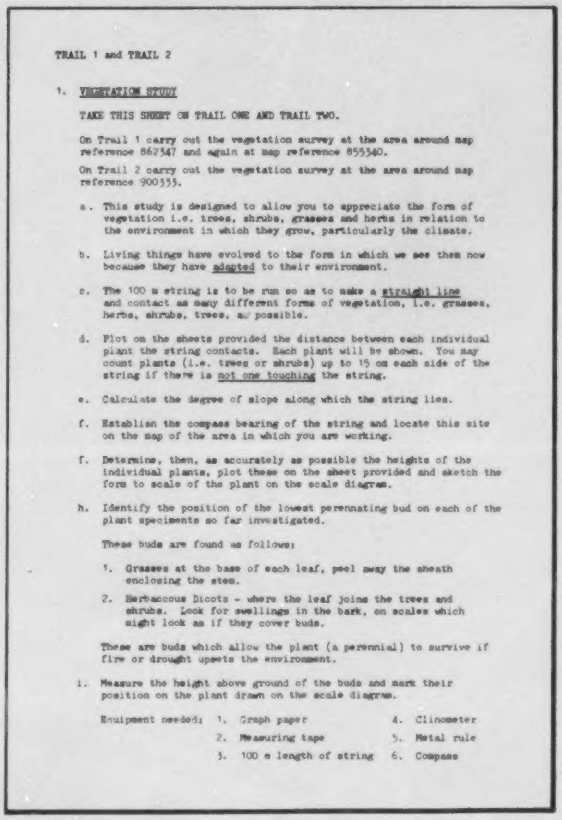
   Estimate Calculation (see 3d)

   a. Danu Dome to S.E. ____________
   Burbie Spring to N.E. ____________
   Baile Rock to N. ____________
   Pea For directly E. ____________

   b. Draw a sketch diagram of these locations and mark in estimated distances.

   c. What difficulties did you encounter? If any explain why.

   d. Having estimated these distances, check your estimate using the topographic map.



TRAIL 1 and TRAIL 2

1. VEGETATION STUDY

TAKE THIS SHEET ON TRAIL ONE AND TRAIL TWO.

On Trail 1 carry out the vegetation survey at the area around map reference 862347 and again at map reference 855340.

On Trail 2 carry out the vegetation survey at the area around map reference 900333.

a. This study is designed to allow you to appreciate the form of vegetation i.e. trees, shrubs, grasses and herbs in relation to the environment in which they grow, particularly the climate.

b. Living things have evolved to the form in which we see them now because they have adapted to their environment.

c. The 100 m string is to be run so as to make a straight line and contact as many different forms of vegetation, i.e. grasses, herbs, shrubs, trees, as possible.

d. Plot on the sheets provided the distance between each individual plant the string contacts. Each plant will be shown. You may count plants (i.e. trees or shrubs) up to 15 on each side of the string if there is not one touching the string.

e. Calculate the degree of slope along which the string lies.

f. Establish the compass bearing of the string and locate this site on the map of the area in which you are working.

f. Determine, then, as accurately as possible the heights of the individual plants, plot these on the sheet provided and sketch the form to scale of the plant on the scale diagram.

h. Identify the position of the lowest perennating bud on each of the plant specimens so far investigated.

These buds are found as follows:

1. Grasses at the base of each leaf, peel away the sheath enclosing the stem.
2. Herbaceous Dicots - where the leaf joins the trees and shrubs. Look for swellings in the bark, on scales which might look as if they cover buds.

These are buds which allow the plant (a perennial) to survive if fire or drought upsets the environment.

i. Measure the height above ground of the buds and mark their position on the plant drawn on the scale diagram.

Equipment needed:
1. Graph paper
2. Measuring tape
3. 100 m length of string
4. Clinometer
5. Metal rule
6. Compass

TRAIL 1

## FRESHWATER ECOLOGY

Do this exercise when you return to camp.

This is a freshwater ecology study. It is intended to give an understanding of:

i. trophic levels of organisms
ii. dominant species in an aquatic environment
iii. aquatic food chains
iv. how a single chain can affect the whole community
v. relationship of animal diversity to plant diversity

### Characteristics of Study Area

Location ______________________________
Elevation ______________________________
Precipitation ______________________________
Temperature ______________________________
  Present ______________________________
  Range ______________________________
Gradient ______________________________
Aspect ______________________________
Soil Type ______________________________
Parent Rock ______________________________
Vegetation Types ____________________________
Date ______________________________
Time of Day ______________________________
Cloudiness of Day ___________________________
Water Temperature ___________________________
Type of Water Body __________________________
Rate of Movement of Water ____________________

### Questions:

1. Select one animal or form of life you found in the freshwater pool, and draw up a possible food chain for this animal.

2. Suggest possible effects on this freshwater environment of:

   a. increasing the weed content of the pool,
   b. chainging the water current (i.e. from still to moving or vice versa),
   c. introducing a predator,
   d. chanigng the temperature of the water.
   e. Man.

### References:

Maxwell - Science for High School Students
Keeton - Biological Science
Photo-copy - Ecology - World Book Encyclopedia

---

TRAIL 1 and TRAIL 2

## VEGETATION SURVEY

Provide the following information about the site along which the string runs.

1. Map Reference: .................... Height: ........................
   Compass bearing: .................
2. What is the direction of the prevailing wind?
3. What evidence is there for suggesting this direction?
4. What evidence is there of running water on the site?
5. What evidence is there of sheet erosion?
6. What evidence is there of fire as a feature of the environment, if at all (relate this to the buds you found).
7. Discuss the information in (2) - (6) with the pattern of vegetation you have drawn on the graph.
8. Sketch the perennating bud and leaf of plants and trees found on this survey.

---

## LANGUAGE

Find a position where you think you can get into the feel of the follow poems. Then answer the questions which pertain to one of them.

### AUSTRALIA

A.D. Hope

A nation of trees, drab green and desolate grey
In the field uniform of modern wars
Darkens her hills, these endless, outstretched paws
Of sphinx demolished or stone lion worn away.

They call her a young country, but they lie;
She is the last of lands, the emptiest,
A women beyond her change of life, a breast
Still tender but within the womb is dry;

Without songs, architecture, history:
The emotions and superstitions of younger lands.
Her rivers of water drown among inland sands,
The river of her immense stupidity

Floods her monotonous tribes from Cairns to Perth.
In them at last the ultimate men arrive
Whose boast is not; 'we live' but 'we survive',
A type who will inhabit the dying earth.

And her five cities, like five teeming sores
Each drains her, a vast parasite robber-state
Where second-hand Europeans pullulate
Timidly on the edge of alien shores.

1. What is Hope's attitude to the Australian countryside?
2. What is Hope's attitude to Australian cities?
3. What phrase shows his attitude to the city?
4. Do you agree with his concept of colour - "drab green and desolate grey"? Explain.
5. What is meant by: "A woman beyond her change of life "?
6. Explain the phrase:
   "Her rivers of water drown among inland sands".
7. Write five lines about the poet's achievement.

---

## ART

Suggested themes to be recorded to communicate the different forms and colours, and show your reaction to a new environment.

1. Distant skyline as you approach from the plains, or the view back across the plain.
2. Contrast of the volcanic rocks rising from the densely wooded slopes or flat paddocks.
3. A study of the columnar jointing.
4. A specific study of vegetation new to you.
5. Impressions of steepness, height, depth.
6. The relation of figures of friends in the above.
7. A pictorial description of your accommodation.
8. A pictorial description of your emotional response to this accommodation, i.e. enjoyment, irritation, coldness etc.
9. A pictorial description of the Tourist Associations facilities in the picnic and camping area.
10. A pictorial comment on the tourists use of the above facilities.
11. Portraits of the Ranger or Wardens.
12. A recording of any event: funny, frightening, interesting, serious, exhausting, etc., which occured while you were there.

# *DEVELOPING A SCHOOL FIELD STUDY CENTRE*

*Jean Whimp*

---

## PREAMBLE

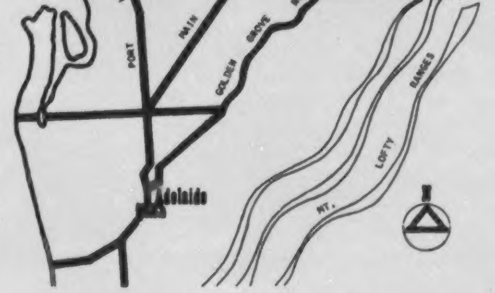
Para Wirra Study Centre in South Australia is a unique example of a co-operative, do-it-yourself venture into the outdoors by four secondary schools. Unlike many field study centres, this one was built by students in a national park within 30 km of each school. Chosen deliberately to be close at hand and so encourage staff to integrate use of the area with their school-based programs, the centre is nevertheless psychologically very distant from the plains from which the students come. As Jean Whimp describes, the staff development programs seen by the schools have been fundamental to the success of the study centre for these have ensured effective use of the site while conserving its ecology, have produced programs and materials, and, more importantly, have enhanced the spirit of co-operation which exists between the staffs of the four schools. This has helped schools to support each other in the use of the centre as an integral part of their school's curricula — the acid test of any such venture.

---

## INTRODUCTION

In 1976 four high schools on the plains north of Adelaide received funding from the Schools Commission to establish a study centre in Para Wirra Recreation Park. The intention to establish a study centre was initiated in 1971 and was based on the belief that through such a centre students would be offered an education that offered real life experiences outside the school and which would make greater provision for the students' total education. Staff in initiating schools were already involved in successful camps at most levels, but these were once-a-year experiences and there was need for a study site close to the schools where students could have more than one experience a year without cost being a deterrent. Para Wirra, a nearby recreation park, was just such a site: it was less than 30 km away from each of the schools.

An area of the recreation park, stretching for 'a mile as the crow flies' and encompassing two old farms, was designated as the study area. The study centre was erected on the less fragile ex-farmland within this.



*Location of the four participating high schools (Craigmore, Elizabeth West, Gawler, Smithfield Plains) in relation to the study centre in Para Wirra Recreation Park. The schools are no more than 16 km from each other*

*The Para Wirra Study Centre, a log cabin 8 m by 18 m is set on the grassy slopes of the South Para River*

Excursions to the study area have taken place since 1972 and by 1979 the study centre and surrounding area were used for an average of one and a half to two days per week. Principal users were junior secondary classes although there has also been consistent use by upper school classes. Four factors can be isolated to explain this continued and successful usage, including the site itself, the support given to its operation, the establishment of clear user guidelines, and the provision of staff development programs.

*A river bed with some fascinating erosional features for geographers, sculptors, geologists, or tired teachers*

## ENSURING THE CENTRE'S SUCCESSFUL OPERATION

### Site Selection

One important feature in the selection of the site of the study centre is its sheer beauty. As students come through the gates, they are confronted with a view of distant hills covered in natural vegetation, and a foreground which at times is daubed with the yellow of Golden Wattles and at other times with a carpet of purple Salvation Jane. Kangaroos, startled by the bus, dart out from their shelter among the trees, but not before students have had an opportunity to marvel at their presence. The site also presents a variety of natural environments and thus a variety of educational opportunities but perhaps most important of all is the sense of wilderness which the site evokes. Sitting beside the river listening to the 'four Bob' concert of the frogs as they take advantage of the resonance provided by the valley floor, one cannot help but forget the world outside.

Grassland with scattered trees suitable for beginners' trails

Virgin scrub for senior studies (art, creative writing, biogeography)

### Support for the Centre

Support given by the Local Council, the Schools Commission and the administration, staff and students of the four schools has been a major factor in the study centre's successful operation.

The centre was the brainchild of the principal of one of the schools who recognised the need in his own school. His idea met with ready support from the administration and staff of the other three schools and this support has been consistently maintained in spite of changing personnel.

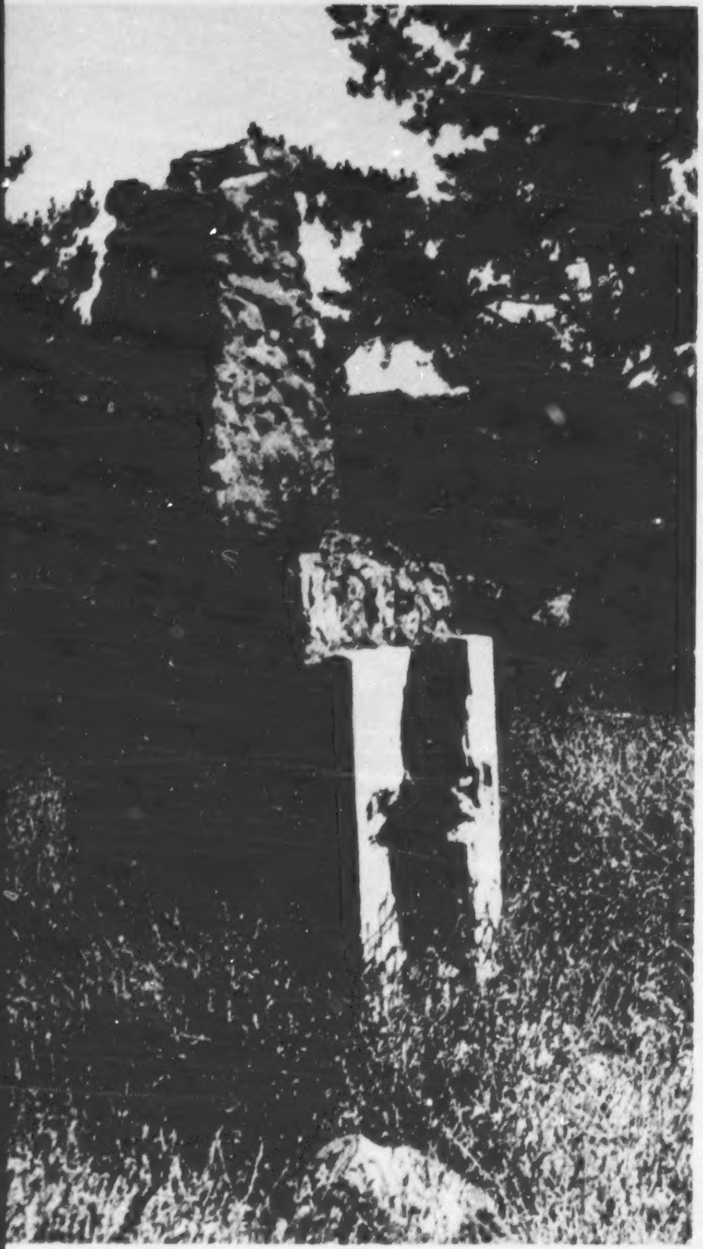
As early as 1971 the District Council was also involved when it gave support to an approach to the Minister for Conservation requesting that an area of the Recreation Park be set aside for use by the four schools.

The Ministers of Conservation and Education gave the project their formal support, recognising it as a pilot project in school use of National Parks and in school-based planning. In June 1972 they gave their approval for the use of the area for day visits and foreshadowed the building of the classroom the following year and accommodation facilities two years later.

It was for the Schools Commission eventually to bring this plan to fruition when Education Department buildings were not available. A Schools Commission grant of $21 670 in 1976 made possible the building of the log cabin shell together with a toilet block and rainwater tank. Internal furnishings (beds, sink, stove) were added as money from the schools became available.

Staff commitment to the project gathered momentum from the commencement of excursions in 1972. In 1974 representatives from the four schools formed a management committee which secured the alternate funding through the Schools Commission. This management committee was given a free hand in this task, in planning teacher development, and in the practical decisions which followed the granting of funds. Their commitment in promoting the growth of the study centre and the programs it supports brought the dream to reality.

In 1976 the principals of the four schools met with the committee to adopt a formal constitution which identified the parameters within which the committee worked and clearly defined its functions. This was a significant step in ensuring that the project would continue even when the enthusiasts of the scheme left the schools. The meeting also identified the need for a co-ordinator to act as the executive officer for the committee and as an initiator and stimulus within the four schools. The beginning of 1977 thus marked a new era for the project for it had a larger



The remains of two farm homesteads with plants and equipment emphasise man's role in the area

management committee working under the new constitution, a half time co-ordinator of the project, and an almost completed study centre.

Not only administrators and staff were committed to the project. The cabin was erected as a work experience exercise for students in each of the four schools with as many girls and boys as possible being involved. One of the principals acted as building co-ordinator. The involvement of students in this way has been a major key to ensuring that they maintain their care and concern for the area.

Gold mine shafts provide adventure even for staff

Students in the creek

*Students at work erecting the study centre*

### Clear Guidelines for the Use of the Area

Another important element was the recognition, early in the project, of the need for clear guidelines to ensure that the study area retained its usefulness over the long term. These were drawn up by school staff and approved by the Director of National Parks and Wildlife who administers the Park.

**STUDENT CENTRE RULES FOR USAGE**

1. Year 8 students to use the grassed area and the river bed, but to avoid the use of the virgin scrub area, i.e. avoid trampling of small shrubs and bulbs in the scrub area.
2. No more than 40 students to use the area at one time.
3. No collection of specimens (i.e. National Park rules apply). A herbarium has been set up under permit.
4. Excursions in the bushfire season only permitted by negotiations with the Ranger.
5. Overnight stays limited to 20 students, i.e. for use in specialist studies rather than as a general campsite.
6. All excursions to be accompanied by a staff member who has attended an in-service conference in the area and can take responsibility for the students' behaviour in the environment.
7. Bookings to be monitored through a project co-ordinator and overnight camp programs to be submitted to the management committee for approval.

In 1979 an environmental assessment plan for the continuous monitoring of the tracks and nearby areas was developed and any changes are to be reported to the management committee.

### Teacher Development

Possibly the most significant factor in contributing to the staying power of the project has been the impetus from teacher development activities. The restrictions set by working in a semi-fragile environment imposed an immediate need for in-servicing of teachers. In retrospect, the teacher development program has done far more than ensure that teachers know how to care for the area. It has become a key to the effectiveness of the centre and is still somewhat unusual in being organised by the staff, for the staff of the four schools.

One of the first functions served by in-servicing was the professional development of the Para Wirra Study Area Management Committee in 1974.

The second teacher development conference was a three-day canvas camp at the site for 20 teachers from the four schools together with consultants with expertise in methodology and knowledge of the Park itself. The conference, held early in 1975, provided the occasion for preparation of booklets and photographs on the plants and birds of the area and for preparation of mini-herbaria and other aids to identification.

The conference focused first on giving teachers an existential experience of the Park which might make an impression not just on their knowledge about the Park and skills in using it, but on their feelings for the Park and themselves. Activities to achieve this end included a talk on the Park by the Ranger, a blindfold walk though bushland, a long hike through the park using orienteering skills, and a weird experience in walking along a horizontal mine shaft into another world. Later, bird and plant experts shared their knowledge.

*Preparing for an existential experience*

The teachers then decided that if students were to be given experiences which would help them to achieve a feeling for the natural environment, then Year 8 appeared to be the logical starting point. Despite the background of the teachers, there was unanimity on the need for student activities to focus on an interdisciplinary rather than faculty-based approach. Interdisciplinary studies are still a poor relation in the secondary schools and it is important to note that the decision to prepare materials across faculty borders came, not out of environmental education literature, but out of the teachers' own feelings that the Park itself was a unity.

A brainstorming session followed. Ideas from this were grouped under headings: Fire, Earth, Water, etc. Imagination was fired and groups penned embryonic thoughts, but it was soon realised that much painstaking work was going to be needed on the writing and resource gathering over subsequent weeks. In fact it took a group of nine teachers nearly two terms to produce the first 'Para Wirra Study Centre Teachers Guide'. (The following paper on Junior Secondary Outdoor Activities contains revised activities from the 1975 Guide.)

*The brainstorming which issued from the teachers' experiences in the Park was exciting for the original and thoughtful ideas it produced.*

In 1976 the third teacher development conference was held, also under canvas but the focus now was on the relevance of the study area in complementing existing subject curricula in the upper school. In addition, staff attending the conference were involved in finalising the selection of the exact site for the study centre. In this way staff of the four schools were caught up in the decision-making within the project. This pattern of involvement and feedback has continued.

Training for middle school usage of Para Wirra was the theme of the fourth round of teacher development conferences in 1977. An urgent need for more staff acquainted with the study area and trained in its use led to the holding of four faculty-based conferences in 1977. Some classes were already using the centre on a faculty basis and needed to develop resource materials suited for that purpose. Thus a science conference adapted the A.S.E.P. units: 'The Australian Scene' and 'Life in Freshwater' to use at Para Wirra, prepared a river study, a rock succession study, and a Para Wirra version of the

Year 11 biology 'Study of a Natural Community'. An English conference produced a book of poetry readings suitable for use in the area and a technical studies/art conference planned usage within the photography and art syllabi and developed a plan for student work on the construction of the study centre.

More recent conferences have reverted to integrated studies and have recognised the need to involve students more actively in studies which will develop their ability to make value judgements. In this respect the 1979 conference was significant in focusing one workshop on 'Man and change in the park environment' while another looked at the way students could be involved in monitoring environmental impact.

The teacher development conferences have produced a large group of staff (approximately one third of each school) who might easily be called 'Friends of Para Wirra'. This group has provided support and feedback for the management committee representatives in each school, enabling them to represent better the needs and interests of their school.

## PROBLEMS

In a project of this size problems were inevitable. Yet it seems that the need to overcome the problems outlined below has contributed to the overall effectiveness of the project.

### Transport

The selection of a study centre site away from any public transport has meant that schools have had to make their own transport arrangements. As a result, three of the four schools have purchased, or been granted, mini-buses, and two schools also have access to the Education Department buses. This simply confirms the evidence elsewhere that schools wishing to have a vital environmental or outdoor education program must consider the availability of an economic and convenient means of transport.

### Time Required for Administration

Until 1978 administration of the project was carried out by staff members working in their own time. It became obvious that co-ordination, teacher development and faculty development required more than teachers' spare time and in January 1978 the Regional Education Office appointed a half time co-ordinator. It seems likely that this time allocation will be increased in 1980.

### Interdisciplinary Excursions

In one school in 1979, a very effective planning group prepared materials which could be used across the first three years of high school. Interested and enthusiastic class teachers readily took up the challenge to use the materials with their home classes. However, there was little time available for preparation and follow-up so that the excursion was in danger of becoming a once only experience out of context with the rest of the studies. Questions arose such as: 'Who conducts the excursions? Who follows up? Which faculty pays for printing? Which faculty donates a time slot for preparation and follow-up? Who prepares the staff members for the excursions?' Such questions are meaningless in a primary school, but they must be anticipated and answered in a secondary school if integrated experiences are to take place.

### Effective Excursions

Teacher development conferences to date have not provided opportunities for staff to develop expertise in the handling of students out of doors. For this reason the management committee has had to rely heavily on the excursion mechanism within each of the schools to provide back-up with experienced staff. This has put a number of pressures on the school: the provision of a bus, as well as a driver, the teacher, an experienced staff member and a staff member who has attended a Para Wirra teacher development conference.

Cancellation of excursions due to bad weather, non-availability of a bus driver, or a host of other reasons, tends to take the centre out of use on a number of days and is a constant reminder of the internal school arrangements which must be coped with whenever an excursion leaves the school. These have led senior staff in some of the schools to make block bookings of the study centre, buses and drivers to ease the organisation for the classroom teacher.

These are day-to-day pressures which are experienced by all who arrange excursions but they are accentuated where the number of excursions to a site or the need for care is greater, as is the case with Para Wirra. It may be necessary in the future, if the project is to have continuing viability, for the management committee to accept some responsibility for ensuring that staff are trained in more than one of these areas.

### Sharing

Surprisingly, there has been no problem over the sharing of the study centre facilities between the four schools. This is probably due to the strong bond of trust and respect which has developed

between members of the management committee. Potential misunderstanding within a school can be set right before it becomes a problem. Conversely, the management committee has served as an encouraging backstop in a committee member's efforts to establish more effective usage within his/her own school.

**Usage**

There are no limits placed on the activities within the study area except those which might endanger in any way the safety of either the students or the integrity of the park. Each school has been free to develop its own pattern of usage. What is significant has been the recognition in each school of the need for a sequential program from Year 8 to Year 12 so that students are not confronted with a similar type of exercise each year.

In one school the Science faculty has taken the initiative in evolving a plan of usage from Years 8 to 12. The Year 8 unit on 'Diversity of Life' includes an excursion to Para Wirra, following which all Year 10 students use Para Wirra as the basis for their study of a natural community using the A.S.E.P. unit 'The Australian Scene'. At Year 11 the skills already learnt in collecting data in the field and presenting it are put to service in a more advanced study of the Para Wirra community in biology and in a study of weathering in earth science. These science studies are integrated with opportunities for creative writing and art work, commencing at Year 8 as a response to sensory experience and continuing to Year 11 where they can be given the opportunity for a far more open approach to creative work.

In another school, day excursions to Para Wirra have been arranged for each class in Years 8, 9 and 10. The approach is interdisciplinary with the theme of the three years being:

Year 8 — Observing the natural environment
Year 9 — Change in the natural environment
Year 10 — Man and change in the Park

Plans for the upper school use of the Park have been determined within faculties, particularly the biology, geography and English faculties. The emphasis is on the Park as a medium for teaching previously determined curricula. This is in contrast to Years 8 to 10 where the Park is used to extend the curriculum.

A third school, which in the past used science faculty administration to present an integrated exercise, has just developed an environmental studies program at Year 12 through the social science faculty. It will use a series of excursions to Para Wirra as the focus.

The fourth school has an adventure oriented program using the park for bushwalking, nature trails and orienteering.

In spite of this diversity there are elements of commonality which are important:

- Inclusion of sensory awareness activities in the Year 8 program with a reduction in the time spent in this type of activity as the student progresses through to Year 11. At Year 8 this might be a blindfold walk followed by a sharing of experiences, or by some creative activity in which the experiences could be expressed, or it might involve following an ant and then pretending to be one. As students move up through the school it is assumed that they have learnt the skill of experiencing with all their senses and so a group studying the river can move directly into creative activity with a less structured build-up of sensory activities.
- Training in skills and processes which can be used in studying the area: observing, measuring, drawing, recording, writing, collecting data, finding patterns, etc. This training begins in Year 8 and is added to each year with a pronounced increase in the use of these skills in the field study required in Years 11 and 12.
- A concern that students will not only increase their awareness of, skill in, and knowledge about the environment, but that these will lead them into developing positive values in relation to the environment. To this end students move from set rules for Park behaviour in Year 8 to writing their own outdoor codes and assisting in environmental impact studies in Years 11 and 12. There is consensus that while we cannot teach students values we can offer them activities which will help them when they come to identify their own values.

## NOW WHERE?

Para Wirra Study Centre, built in a South Australian recreation park, is one example of a grass roots development in environmental education which is continually evolving. What began as an exercise among biology seniors in the four schools has expanded to encompass almost all faculties and levels within the schools.

The building and basic facilities are now established and the schools have had opportunities to develop and trial their materials. The past has been full of activity. There is time now for each school to reflect on its Para Wirra program at faculty, staff and senior levels, enunciating or restating the outcomes which have been expected from activities at Para Wirra at each year and faculty level.

To date reflection and evaluation has been a management committee task. It is appropriate that all who use the Centre are involved in its evaluation.

Hopefully the future will see an increase in overnight usage, more effective preparation and follow-up in schools, and an expansion of the teacher development program into other curriculum areas and other areas of the Park.

Many primary schools and some other secondary schools currently use the Park but not the centre or its facilities. Hopefully the materials and the expertise developed by the four schools can be offered to these schools in the future.

# *JUNIOR SECONDARY OUTDOOR ACTIVITIES*

*Jean Whimp*

## PREAMBLE

The Para Wirra Study Centre in South Australia is a unique example of a co-operative, do-it-yourself venture into the outdoors by four secondary schools. Unlike many field study centres, this one was built by students in a national park 30 km from each school. Chosen deliberately to be close at hand and so encourage staff to integrate use of the area with their school-based programs, the centre is nevertheless psychologically very distant from the plains from which the students come.

An in-service program run by the schools to ensure effective use of the site whilst conserving its ecology produced programs and materials and more importantly a spirit of co-operation between the school staffs. The program focused first on giving teachers an existential experience of the park which aimed to develop their knowledge about the Park and skills in using it, and more importantly, to develop feelings for the Park and their attitudes towards it. Activities to achieve this end included a talk on the Park by the ranger, a blindfold walk through bushland, a long hike through the Park using orienteering skills and a weird experience in walking along a horizontal mine-shaft into another world. Later, bird and plant experts shared their knowledge.

The teachers then decided that students should be given an opportunity to have similar experiences. Year 8 appeared to be the logical starting point. There was unanimity on the need for student activities to focus on an interdisciplinary rather than faculty-based approach to study in the Park, despite the background of the teachers. A brainstorming session followed out of which this resource book was born.

The activities, while developed at Para Wirra, are applicable to most field study centres and have been written to accommodate regulations governing national parks. This present revised edition has been reprinted with the permission of the authors.

## INTRODUCTION

The variety of exercises included here have a two-fold aim:

(a) To develop an awareness, sympathy and knowledge of the environment as a living entity.

(b) To develop skills associated with the traditional formal disciplines of the secondary school curriculum.

It is suggested that the teacher using these activities should decide on his/her own specific objectives consistent with these aims and should select activities best suited to pursuing these objectives. The decision on how the activity will be evaluated should be made during the planning stages of the activity.

Concepts of environmental and outdoor education provide vehicles which enable traditional disciplines to be seen to interact with one another.

With this in mind, activities prepared are offered on an interdisciplinary basis using the following organisational headings:

CREATIVE ACTIVITY, TIME, EARTH, AIR, WATER, PLANTS, ANIMALS, FIRE.

## CREATIVE ACTIVITIES

Creative activities make people more aware of the aesthetic value of nature and so foster a desire to conserve the beauty of the natural environment.

The restrictions placed on the removal of any type of matter in the Park *do* limit the type of creative activity that can take place, e.g. collage and weavings made of natural things.

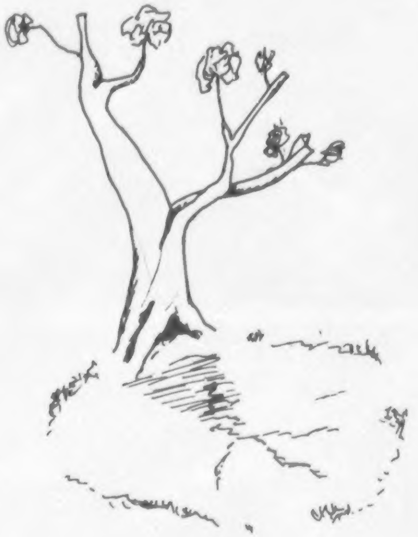
Before beginning any creative activity, students should be given a chance to *acclimatise* — to get to know the Park through all their senses by means of a blindfold walk, a long hike or one of the other activities suggested in this booklet or in Van Matre's books (1972, 1974).

*Pothole in creek*

Acclimatising can then be followed straight away with a creative activity. Acclimatising activities should be aimed at increasing and fostering *awareness of the environment* by using Van Matre's (1974) techniques of touching, smelling, tasting, hearing, focusing, orchestrating, etc. Colours, shapes, textures, forms, sounds and patterns can serve as a basis for paintings, designs, sculptures, reliefs, graphic work or weaving or they may stimulate poetry, descriptive writing or micro-photography.

## CREATIVE WRITING

*Descriptive:* Briefly discuss what descriptive writing entails — accuracy, fluency, feeling, style. Select something to be described. Ask students to sit quietly, observe the chosen aspect of the environment, and then write down words and phrases that describe the object.



*'The old gum tree stands twisted and knobbled, like an old man, crippled with arthritis, staring into a pool. It is majestic and supreme over all around it. His sons and daughters, shooting boughs higher into the air as they compete for sunlight, are no threat, for he is taller.'*

Year 11 student

*'The emus' feet were big and clumsy and they picked their feet up like they had big clumps of mud on the bottom of them.'*

*The story:* This is not always a successful form in the Park. The stories tend to be melodramatic, patronising the wildlife. Why?

*Writing that explores the self:* A good exercise that encourages this response is to ask students to find something quickly (a leaf, a twig) that they can relate to their lines . . .

> *'I feel I am like a stone because I'm hard, rough and tough.*
> *I am always kicked aside like a stone.*
> *Perhaps some day, someone will pick me up and show my true colours to the world like an opal.'*

*Writing that concentrates on form:*

---

SHORT, SHARP DESCRIPTIVE LINES
*'Rock dark perched, very solid.'*
Year 11 student
These can be rearranged later to form a poem.

---

DYLAN THOMAS PORTRAITS
*'Did you ever see a frog*
*Green gowned, slimy*
*skinned, croak voiced.'*

---

HAIKU (3 lines)
atmosphere ........................................ (5)
mood ........................................ (7)
significance ........................................ (5)
*'Long rippling body*
*Sightless gaping in the dark.*
*A shoestring quite lost.'*

Year 10 student

---

THE FORM POEM
Individual words connected by association
4........................................Rhyme A
3........................................Rhyme B
4........................................Rhyme A
3........................................Rhyme B

---

THE SYLLABLE POEM

| | | | |
|---|---|---|---|
| Syllables in each line are shown | 1 | — | I |
| | 2 | — — | was blind |
| | 3 | — — — | in the Park, |
| | 4 | — — — — | feeling my way |
| | 5 | — — — — — | around the tall trees |
| | 4 | — — — — | smelling, touching. |
| | 3 | — — — | Trees, I know |
| | 2 | — — | you well |
| | 1 | — | now |

---

*Sit students alone and ask them to write down their thoughts:*

> *'Just looking at the horizon, the trees seem to be mostly on a similar level, making the horizon look like a straight line. Therefore I see the trees as conformists, not willing to break the standards set by the average tree.'*

Year 10 student

**Blindfolding**

There are a number of alternative ways of conducting this exercise:

1. Blindfold as many in the group as possible, non-blindfolded students used as guides and to work cassette recorders.
    - Students stay blindfolded for at least an hour and sometimes two — I think the longer the time, the better.
    - During the blindfold walk, stop and (still blindfolded) have group discussions. Individuals are interviewed on the cassettes regarding their feelings and awareness of the surroundings.
    - If possible, photos on polaroid film are taken of the group during the walk (for later discussion of incidents, facial expressions, etc.).
    - Students become aware of their senses — sound, smell, feeling, even taste, and aware of their internal thoughts and emotions (as well as of nature).
    - Read to them whilst blindfolded (e.g. poems about blindness). Back at school, photos and cassette recordings are discussed and writing of a personal type may follow the discussion. Evaluation — of the discussion and the writing.

> *'Just listening to the frogs croaking and other noises gave me the feeling of content. I wished I could have stayed there longer, I would enjoy it more.'*

Year 8 student

2. Students are blindfolded and hold onto a rope 1 metre apart. They have bare feet to feel the terrain and use their hands to feel where they are going and to touch the things around them. Sit them down every now and then, to feel the ground and describe it. Give the students objects and ask them to describe them.

3. Students may be blindfolded and given an individual spot where they can sit and listen to the birds (how many can they hear?)
    - Describe any other sounds.
    - Describe where they are (position of sun, trees, shade, etc.).

    *Feedback:* Discuss briefly the sort of thing they experienced, felt, thought, etc. (anger? frustration? anxiety?). Then ask them to jot down ideas for later writing up as either prose or poetry.

### A Sense of Smell

Use task cards with the non-blindfolded person leading his partner.

- Lead to several different types of plant: smell each, then lead back to one of the plants. Can the student distinguish each one by smell alone?
- Smell the ground. What can you tell about it by just using your nose?
- Sniff the air — in the valley, on the ridge top, in sun, shade, wind and near the ground.
- Smell different animals.
- Check the prevalent smells at different times of the day.
- Try associating different smells with emotions — happy smell, hungry smell.

Write a poem, piece of prose or make a painting which reflects the discoveries you have made whilst being blindfolded.

### Students in the Field

*ROCKHOPPING* (Year 8 student)

*'When I went rockhopping*
*I felt relaxed and*
*I didn't have a care in the world.*
*It was like frolicking in the sun.*

*. . . we were jumping from rock to*
*rock over the water when trying to*
*get to the plants we were looking at.*
*. . . I felt like I was free and that I*
*could just about fly across the rocks*
*as easy as anything.'*

*BLINDNESS*

'Blindness, blacked out from the world
A wonderland without colour.
Trees rustling, birds singing.
But where are the graceful, swaying branches or the colourful wings?
Nowhere.
Lost forever in a black world called blindness.'

*ON BEING BLINDFOLDED* (Year 8 student)

*'Listening'*

*'I heard the kookaburras laugh at me*
*They mocked and sang as I blundered about,*
*I, with my stumbling, jutting movements*
*Must have looked so clumsy,*
*For they are so graceful in all their movements.*
*From their sounds of laughing and singing*
*I could tell what they were thinking as I sat there and listened.'*

*Trail along a creek*

*Students blindfolded*

### Drawing

With the exception of photography, this is one of the easiest ways to visually record something.

Drawing promotes careful observation of the main characteristics of an object (the process of selection, and subsequent elimination of unnecessary detail, is a unique experience, more intense than in photography). It can be used to record things for design, sculpture, or painting, or as a finished piece of artwork in itself.

The drawing should follow some activity which makes students *aware* of the environment. Acclimatising techniques such as focusing, framing, grouping, orchestrating or a hike should thus be used *prior* to drawing.

Follow this by asking the students what they are most aware of:

- patterns, shapes, lines
- movement
- colour, tone contrast
- feeling of space

They can then examine their chosen aspect using any of the following media:

*Craypas:* Excellent, but tend to be messy.

*Conte/charcoal:* Can be used but need a fixative.

*Pencil:* Line or tone drawing with shading.

*Felt pen:* Used with a brush and water to give a wash effect.

*Pen and wash:* Outline in pencil, wash in water, colour, add details with a mapping pen.

### The Hike or Introductory Walk (also see AIR)

After a long hike, the students will have quite vivid memories of the country they have passed through. To enhance this memory and provide a relaxing enjoyable activity, the hike can be followed up by a mural depicting the area traversed.

If possible, allow the students to select the section of the mural on which they will work.

Use a *map* as a reminder to students of the areas they have seen and their sequence. The route can be divided into parts depending on the numbers doing the mural. Each group should discuss the main characteristics of their area and make a rough draft.

The mural should be worked as a whole — students working adjacent to each other should discuss ways of joining their areas.

### Photography

Photography can be used as an art in itself, or as a means of recording to be used as the basis for artwork. This applies particularly to things which do not stay long enough to record with a drawing:

- the effects of light on the landscape
- dew on cobwebs
- a sundew devouring an animal
- close-up work

*Photography* which is *used to aid* in painting should *not* be *copied*, but rather *interpreted.*

*Butterfly on sundew*

*Detail under a microscope*

### Designing under the microscope

Drawing done with the aid of a microscope can provide the basis for abstracts, painting, designs and graphic work, as well as aiding scientific understanding.

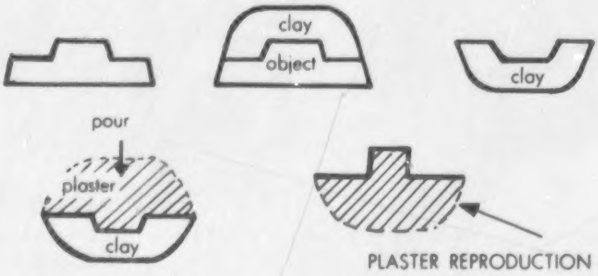
- Using the microscope make a detailed drawing of one part of the object.
- Make a colour key of all the colours in the object.
- Select a small part of the detailed drawing for the abstract design.
- Select shapes from the drawing.
- Rearrange to form a design.
- The drawing may already provide the basis for an abstract design or painting.

### Relief Sculpture — Casting in Clay

Seeds, pods, twigs, cones found in the Park can be used in relief sculpture without removing them.

You need: clay, icecream container, plaster.

Each student will be able to make a section of the relief. In order that the parts will fit together, some thought needs to be given to the shape of the casts. They could all be made in icecream containers.



Place a slab of soft clay in a container. The slab should be about 50 mm thick.

Find natural objects with interesting shapes and take an impression in the clay. The depth and placement of the impression needs thought as they will form the design of the relief.

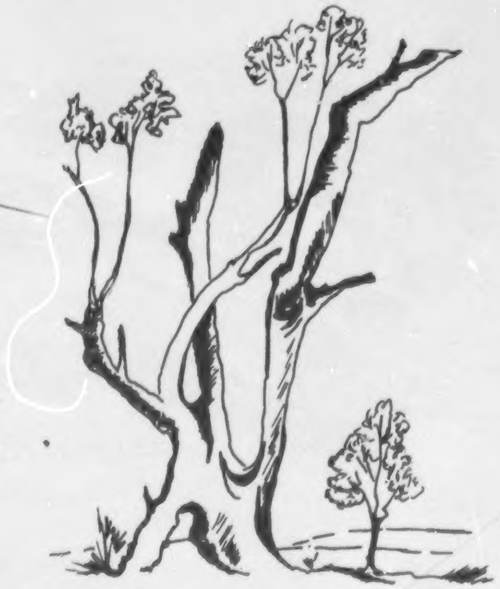
Fill the cast with liquid plaster. When dry pull away the clay. The plaster reliefs can be arranged to form a large relief sculpture and either sprayed or painted for effect.

### TIME

*INTRODUCTORY WALK* through the study area. Students observe, and place in categories, evidence in the environment which belongs to different periods of time. Students might come up with a list similar to this:

- hills, rocks, river
- trees, plants, grasses
- farm, truck, stump of trees

This could then be linked with a discussion of the changes effected by man in the Park and the groups' evaluation of these changes.



*DISCUSSION OF HISTORICAL TIME* can centre around the fact that aborigines inhabited this area for thousands of years:

What evidence is there of this?

What evidence is there of white man's arrival over 140 years ago?

What evidence of man's destructive influence since?

What can you find out about the history of usage of the area?

### Aboriginals in the Setting

Explore the area and discuss how it would have looked 150 years ago.Students should choose an 'ideal' site for an Aboriginal camp. Examine the area and come to conclusions as to how Aboriginals would have found food, shelter, some clothing and necessities for life in this area.

Students make observations as to the availability of stones, resins, wood, fibre, ochres, bark, etc. which could be used for tools, fire, and producing bark utensils and paintings.

### Aboriginals — Dreamtime

Discuss how and why myths came to be written, then read a Dreamtime myth, with perhaps Aboriginal music in the background.

Students can then write their own 'myth' about any striking object in the area, e.g. a large gum, a boulder, the stream.

Dancing, singing or music exercises can tell a corroboree story. Mime and background chanting can tell a Dreamtime myth.

Aboriginal dances mimic animals. Choose animals in the area and mime their actions.

Encourage the students to 'find their spot' and relax comfortably while they listen to the myth or music.

### Aboriginals — Tracking, Signals, etc.

Challenge students to travel through an area leaving no signs for a tracker. (Is it possible?)

OR

Students leave simple signs for a tracking group, e.g. an overturned stone, some flattened grass.

Sign language was necessary for aboriginals to close on prey. Develop a sign language code. (Quiet! Close in! Stop!)

### White People

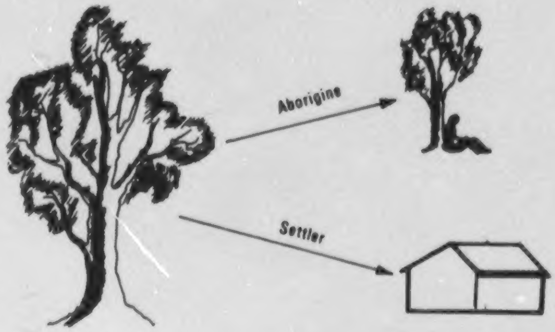
Mimed presentation 'The Aboriginal first encounters a white man'. Use sounds only to tell of an event (e.g. silence, rustle of trees, horses hooves, timber felling and nails being hammered). Build up a film telling the story of the Park through phases such as Aboriginals, the white farmer, the gold rushes, return to Parkland. This could also be achieved by a series of slides (untouched area, cleared land, mining ruins, regenerating area).

### The Park Through the Eyes of Aboriginals and Explorers

Students are divided into two groups. One group pretends they are white explorers surveying the area, the other pretends they are Aboriginals. Each group has to report back on the potential of the area as a living place. They make up a list of useful/nuisance objects . . .

Large gum — Aboriginal . . . shelter from wind and sun
— surveyor . . . tall timber for building

Back at school transfer the information to a large chart.



### Seasonal Time

Comparison exercise would be best done on two separate visits — at the end of summer and during winter or spring. A slide collection would also help.

Pretend you are:

- a lexicographer (dictionary writer), OR
- a poet

Describe a variety of grass, the wind, a gum tree in summer, spring, winter.

Imagine you are a brown thornbill (or any other bird or insect). What do you see, hear and do on a summer's day? What happens if a violent thunderstorm engulfs you?

### Drama in the Park

*Scene:* Para Wirra Aboriginal settlement which is visited by the first white men the inhabitants have seen.

*Characters:* White men and women, Aboriginal elders, men, women, children.

*Action:* Normal time as Aboriginals go about their tasks at meal time. The white men approach at normal speed. As they see each other, the time/motion changes to *slow motion* because we can then examine in detail what we feel would be each of their reactions.

### Time Machine

Imagine you find a time machine in the middle of the Park, and cannot resist projecting yourself through time, into the past, or into the future.

Choose a period millions of years ago, during Aboriginal settlement, or during the farming days or busy gold rushes. Who or what do you see? What happens to you? If you choose the future, what has happened to the Park? What adventures befall you?

### Time Capsule

Prepare a time capsule to be unsealed by succeeding students at the Park in 10 years' time.

Divide the class into groups to prepare ideas, e.g. an explanation of your presence, a typical newspaper, a photograph, a tape of latest hits, some sketches of the latest 'in' gear. What else do you think MUST be included?

### Mechanics of Time

*MEASUREMENT THROUGH THE AGES (*pre or post-excursion activities)

What were the earliest ways of measuring time? (Sun, moon . . .) Find out something about water clocks, shadow sticks, sand clocks, candle clocks and sundials. This activity could be initiated at the Park, researched at school before a second Park visit.

*The time capsule: what would you put in it?*

The Advertiser
bishops, says
Pope
Original Hits
Original Artists

### Time and Art

Make a study of texture, line, colour, tone, shape or form showing the effects of time on natural surroundings, e.g. texture changes in the bark from a seedling to a ten-year-old tree to a very old tree.

### Internal Clocks or 'Biological Clocks'

This topic may arise at the Park when talking about mating, growth, flowering, seeding times. Students will be familiar with one of the circadian (24 hour) rhythms of their own body: sleep and waking. While man's rhythms can be adjusted, plant and insect rhythms are less easily altered. Leaf movement, for instance takes place on a 24 hour cycle and could be a subject for study. Yearly patterns of flowering and seeding could also be observed and the variation within them observed over a period of years.

## EARTH

### Creative Writing

Set the mood by reading an extract from 'The Nargun and the Stars' (Wrightson, 1973). Ask students to pretend they are some kind of animal or plant or a particular person. With this in mind, ask them to look carefully at the surface of the rocks (texture, colour, shape, etc.) and select one rock which appeals to them.

Sit near the rock and *write* either a *poem* or a short piece of *prose* entitled *'That Rock'*. Use suggestions from the creative section.

Discuss the different ways that people explain the origin of parts of our environment, e.g. primitive groups — Aborigines; biblical story of creation; scientific explanation of weathering and erosion.

Read an Aboriginal myth, e.g. 'How the flat topped hill came into being'. Students can then select a particular feature of the area and write a myth about its origin. Create Aboriginal-style paintings based on this myth.

### Painting Landscapes or Making a Collage

Students scattered over the area can show different impressions of slope, height, etc. Seasonal changes can also be emphasised. Sketch features of the landscape and indicate colours. Make a collage using the sketch as the basis.

The land we are walking on has been trodden on by many feet — bushwalkers, settlers, Aborigines and many others. Select one person and paint what the land meant to them and how the land treated them.

### Integration of Earth Studies

Walk students over an area. Ask how they can tell that the land surface has changed (observation, puffing . . .).

Ask what builds up or wears away the landscape. Which factors are important here and what evidence is there? How can the effects of large numbers of students on the landscape be minimised?

Groups to make a picture coverage of the area with a limited number of slides . . . to show vegetation, major relief, etc.

Field sketching of features of the landscape.

### Linocuts, Papercuts, Clay or Plaster Tiles

Observe patterns, designs, colours, textures, shapes, etc. of rock surfaces. Using this information, sketch simple design patterns to represent rock surfaces. Design can then be put onto lino tile or paper, to be used as linocut or papercut. Alternatively, mark the design pattern from above onto the surface of clay or plaster tablets.

### Mapping

Preselect several areas for students to map and have these marked out.

Using compasses to measure angles and pacing to measure distances, students mark in position of rocks on their base field map (all points can be cross checked). The surface dimensions of the rock can be measured and recorded.

Using this information, students can prepare a final map showing position and area occupied by rocks.

### Soil Particle Study

Students become aware of the variety of particles making up the soil in one place, and how they differ from one place to another.

Brief introductory exercise, e.g. walking over a particular area, communicating, questioning, etc. on the soil particles.

Arrange students in work groups, perhaps down a hill slope. Each group would need binocular microscopes or hand lenses and writing materials. Sketch the variety of soil particles, with emphasis on colour, shape, size, texture, number of each particle in relation to others, etc.

### Research

What makes up soil? Why does soil vary from one place to the next?

### Temperature changes and their significance

Students need to work in a variety of different areas (e.g. bare soil, grassy patches, trees and shrubs, slopes facing sun and shade, near rivers, etc.).

Take temperature at surface, 1 cm, 2 cm, 3 cm depth at each site.

Record:

- any *factors influencing temperature* at that site;
- any *characteristics due to temperature*, e.g. lizards basking in the sun.

## FIRE

### Before Man

Could there be fire in the hills before the coming of man? Find out how fires can start without any help from man. Could this have happened in the bushland which is now the Park?

### Man and Fire

Pretend you belong to an Aboriginal tribe which lived along the river. Choose a place to build a fire for your family. Why do you need the fire?

- To signal to a neighbouring tribe?
- Protection from evil spirits?
- To drive out game from the dense bush or to attract fish?

Draw a plan of your camp site, showing where you would light the fire. Mime the purpose of your fire.

### The White Man and Fire

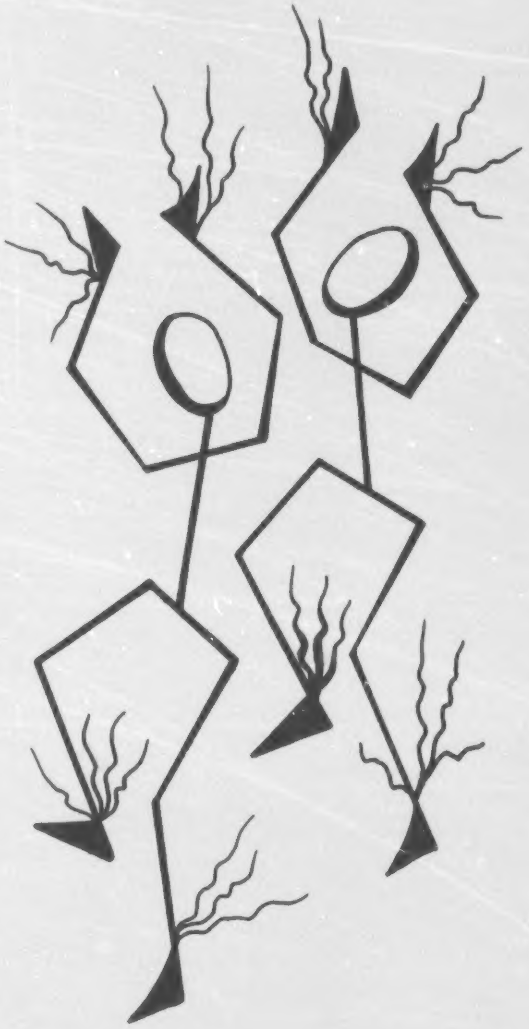
How does the white man use fire in the Park? What precautions are taken to prevent fires from spreading in the Park? Ask the Ranger about firebreaks, water points and roads. Why are visitors allowed to use only the cement fireplaces for their barbecues? On a map of the Park, map all the places where water is available for fire fighting.

### Drama — A Fire Dance

Wear red and yellow streamers cut from crepe paper. You need about 10 fellow students.

All crouch down in a small circle. You are a fire first starting.

Now begin to flare higher and out from the circle, moving in jerky, short lines, looking for dry grass to burn.



Suddenly there is a puff of wind, getting stronger, and you are away, in a line of flame, racing across the hill.

Another line of students with grey streamers, representing rain, could move up from the western side, and chase the fire, finally extinguishing it.

### Poetry

Choose some hot, crackling words to write some quick scorching ideas about fire.

### Music

Compose sounds you think the fire would make as it races through the bush.

Add the sounds of alarmed birds and animals fleeing the fire. Then add rolling thunder and the hiss of rain.

### Myths about Fire

Before taking students to the Park, read books of Aboriginal fire legends. Allow students to discuss the legends they have read then suggest they write their own legend about fire in the Park. The story should explain how fire began and how it came to the Park.

### Living Fire

Walk through the Park on a dark moonless night. What luminous things can you find? (Look for fungi on rotting logs or luminous insects.) Sit very still for 10 minutes or more, then shine your toch all around you. Can you see any eyes shining in the dark? What colour are they? Are there any eyes in the trees?

*(Seek the Ranger's guidance in the areas to use for the following activities.)*

### Regeneration (New Growth) After a Fire

Measure off a strip 10 x 1 metres in both burnt and unburnt areas. Choose 2 or 3 conspicuous plant species in the unburnt area. Make a count of the number of each species in the measured strip. Do the same in the burnt area and compare your counts.

### Older Fire Areas

Mark out a 10 x 1 metre strip in an area which was burnt our several years ago. Compare counts with the unburnt and recently burnt areas. Does any *one* plant become more plentiful after fire?

### Fire and Trees

Study the trees in the burnt and unburnt areas. Compare the thickness of the bark on the trees which have *survived* in the burnt area with the bark on the trees in the unburnt area. Does the thickness of the bark help a tree to survive? What do you think?

### Posters — Fire

Students who already appreciate the beauty of the Park can be taken to an area ravaged by fire to appreciate the full effect of fire. They can then collect information for a poster on 'fire'.

Make sketches of things badly affected by the fire.

Make a colour key of the colours found in the burnt out area.

Captions for the poster should be left to the students. Designs and colours can be obtained from their sketches and colour key.

## AIR

### Introductory Walk

Using air as a theme, send students for a walk along a predetermined pathway.

As they walk, students should note the part air plays in living processes (plant and animal) and non-living processes (weathering). They should also note how air affects the various senses and any change in sensation as they move from one area to another. The importance of air as a medium for energy transfer (light, sound, wind, chemical) can also be developed.

Students can come to appreciate air as an integral part of the environment as well as a connecting link between the various parts of the environment.

### Drama

Students could mime various objects moved by the air, e.g. birds, falling leaves, rustling leaves, paper, clouds . . .

### Blindfold Exercise

While blindfolded, listen for as many sounds as possible which are made by moving air and

attempt to identify them and to determine how far away the source of sound is.

Have students walk blindfolded for a short distance (via guided rope). They can note the wind changes by the effect on their skin. Ask one student who is not blindfolded to tape their discussion as you talk to them along the rope, asking them to describe the feel, smell and sound of the air.

### Making Sounds

How many sounds can be made using natural objects? Relate to pitch, intensity and quality. Refer to the section *WATER — sounds by the water*, for a suggested method of identifying the pitch of sounds.

List the bird and animal sounds of the park. Try recording them in the way described in the section *ANIMALS — bird calls.*

### Aerofoils and Streamlining

Examine the effects of various kite shapes on stability and movement. Examine the effect of leaf shapes on their falling motion. How do birds and insects fly? Observe and research.

What evidence can be seen of wind resistance in the Park? Observe as many examples as possible of the buoyancy of air (clouds, smoke, dust, leaves, birds . . .).

Make a list of all the effects which would occur, in order, if suddenly there was no air in the Park.

Measure airborne pollutants at Para Wirra and compare with the school.

### Weather

Monitor and accumulate statistics for rainfall, humidity, maximum and minimum temperatures, wind speeds and directions, cloud cover, etc. Students like to be involved in methodical gathering of data. Use time lapse photography to show cloud movement over a period of half a day.

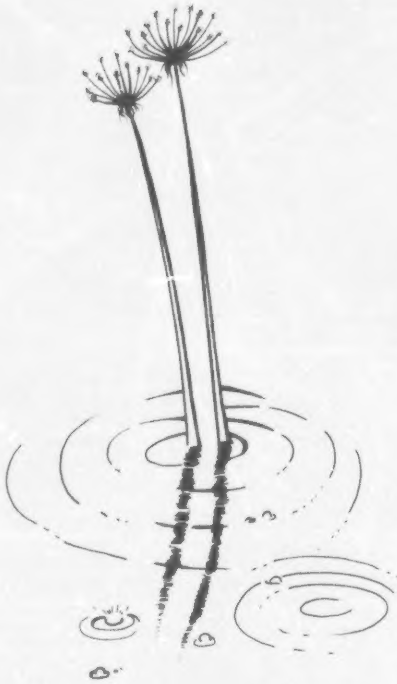
Students could build up a collection of weather rhymes of the farmers and fishermen, e.g. 'Mackerel sky, not long dry'.

### Air and Human Physiology

Measure heart rates and breathing rates before and after climbing from the creek area to the open area. Later compare the changes on a similar distance over flat country.

### Birds

See the animals section.



## WATER

### Shapes — Wave Patterns

Choose a wide pool, as calm as possible and throw a small pebble into the pool. Watch the pattern of ripples which begins when the pebble breaks the surface. Draw the pattern. Which way do the ripples move? Ask a friend to throw a pebble into the pool at the same time as you throw one, but a metre away from yours. What kind of pattern do the ripples make now? Try to draw it. Try three pebbles, then try one near a smooth bank. Can you explain the ripple patterns?

### Shapes

Look for stones shaped by water. Does *water* carve the stones? Look at some small stones in a shallow pool. Are they all the same shape and have they any sharp edges? Look at similar sized stones from high among the rocks above the creek. Are they the same shape as the creek stones? What differences are there? Draw examples of each using thick crayons and

suggest reasons for the differences in shape. The students may like to sit IN the large sculptured rocks in the creek while they describe their shapes. The rocks can then be used as the setting for a story, particularly for students who have read *The Hobbit* or *The Nargun*.

### Textures

Look for large areas of rock in the creek. Make a rubbing with crayon on paper of a rock surface near the present water level. Now use another area of the paper and repeat the exercise for a rock high above the water level. Compare — is there a difference? If so can you explain it?

### Sculpture — 'Down the Creek'

The WATER itself is one of the greatest sculptors and it provides in its creations endless inspiration. Rocks, boulders, pebbles and wood, moulded by the water provide shapes, textures and colours that can be used as the basis for sculptures.

Make three-dimensional drawings which can be used as the basis for sculpture. Students will need to use tone to get three-dimensional quality. At least three views must be drawn — side, top and front view.

Textures to be used in sculpture could be collected by rubbings rather than drawing.

The sculpture itself can be made back at school or at the camp with materials brought from school.

### Reflections

Find a calm pool which reflects the rocks and trees on the bank above it. Study each plant, rock and cloud in turn. Is the reflection the same as the real thing? Are the colours and shapes the same? Can you explain any differences? Make a drawing or painting of your 'mirror' pool.

### Colour of Rocks

Look at a dry surface of rocks near the creek. Pour water over them and notice any difference in colour or pattern. Can you explain it? Draw the pattern of colours on the rock surface.

### Colour of Water

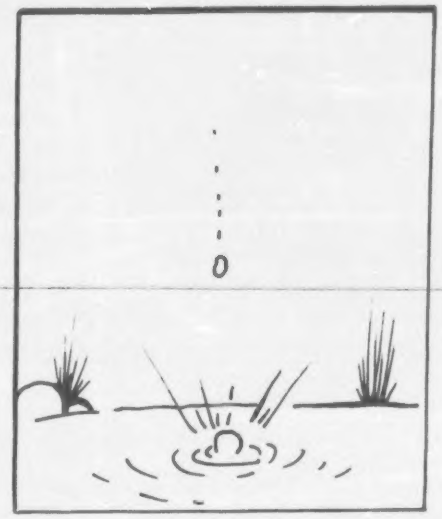
Look for small pools of water on the surface of large rocky areas in the creek. What colour is the water? Are all the pools this colour? Can you explain it?

Place a drop of water from the coloured pool on a microscope slide. Cover with coverslip and examine it first under low power and then under high power. Can you account for the colour now?

Find a stagnant pool which is bright green and examine a drop of this water with your microscope. What makes water green? red? brown?

### Sounds by the Water

During the blindfold exercise, ask students to sit by the creek and listen to the *sounds* the water makes. Share ideas on what you heard, then listen to the tape the teacher has made of the sounds. With the blindfold off, draw the patterns the sounds make (see suggested method in animal section).



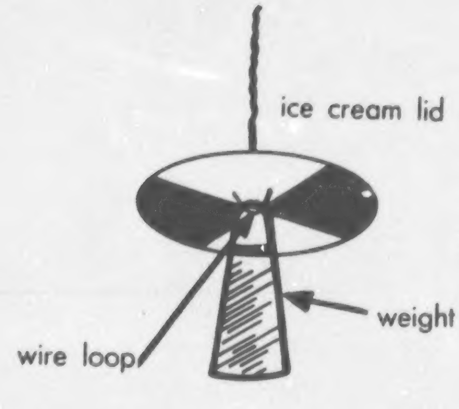
Throw a small pebble into the water. Listen to the sound it makes. Try another pool. Are the sounds the same, higher, lower? Now use a weight on the end of a string. Measure the depth of the pools. Which pool gave the highest sound when you threw in the pebble? Does the depth of the pool affect the 'plop' when you throw in a pebble?

### Movement in Water — Mural

A mural, with its common theme, provides an opportunity to work together, learning to co-operate.

A theme such as this can be approached through abstract design. Each student can make a design based on movement in water, then several can be combined or one used to form the basic design.

To add interest, textures and shapes from the creek can be added to some of the shapes formed in the design. Each student should collect drawings and rubbings of shapes and textures, then suitable ones can be selected by the group for use in the mural.



A colour key can be made from part of the creek.

Parts of the mural can then be completed by each student.

### How Clean is the Water? — Measuring Turbidity

Measure the turbidity (opaqueness) of the water using a turbidity disc made from an ice cream lid (A.S.E.P., 1974, 13).

### How Fast is the Stream? — Measuring Speed of Flow

Use a polystyrene cube to measure the speed of flow of the stream (A.S.E.P., 1974, 11).

### Living Things — in the Water

Lie very still on a rock with your eyes fixed a few inches above the water. Watch very closely where the water is fairly still. Make a list of all the living things that you see.

Free moving — water beetles, tadpoles.

Clinging to stones — small worms, snails.

### Living Things — Visitors to the Water

Sit very still on a rock in the creek in the late afternoon and make a list of the visitors who come down to the creek to drink (birds, kangaroos, insects, others).

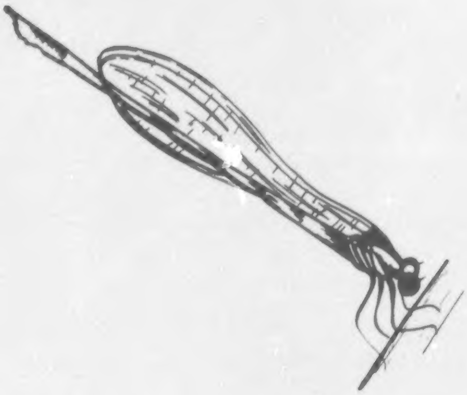
Share your findings with your group.

OR

Sit near the pool on a hot summer day and notice which birds remain because there is no water elsewhere. Use a reference book to help you to identify them.

### Living Things — Near the Water

Compare the stems of plants which live in or near the creek with stems of plants which live higher up the hill. Where do most plants with hard woody stems grow? Are there mosses and liverworts high up on the hill?



Where do you find plants with soft green leaves? Where do the plants with stiff spikey leaves grow? Can you suggest why?

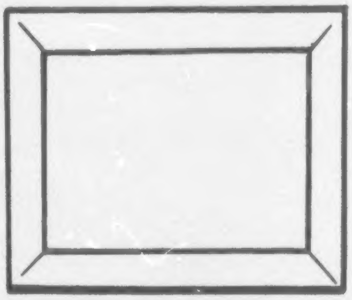
### Living Things — Carried by Water

If you walk along the creek bank, you will sometimes find plants which are strangers to the Park. They don't belong there. Roses! Watsonias!

How did they get there? They are not native Australian plants, How many strangers can you recognise? Are they more plentiful than Australian plants at some points?

### Landscape Painting — 'Down the Creek'

One of the hardest steps in making a painting is the selection. To help students in this, have them make a small cardboard window through which they can look. This will frame part of the landscape.



When aiming for a naturalistic representation of a landscape, *observation* must be emphasised. Keep *looking* at the subject. Make sure all students include a part of the creek in their composition. Draw up with pencil or brush. Paint in basic colours so that whole board is covered with paint. Add necessary details, e.g. light and shade.

### Life of the Creek

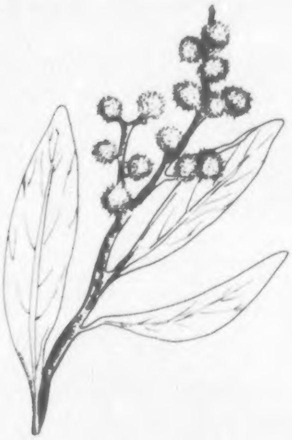
Give students ample time to just *sit and observe* the birds, insects and other living things that live near, or in the creek.

Discuss life in the creek and the inter-relationship of organisms in the creek.

Make preliminary drawings of imaginary animals that might come to the creek, OR illustrations for a myth they have created. Do the painting *at the creek* to sustain the inspiration of the surroundings.

## PLANTS

Looking at plants in the past has often been a dull activity — it does not need to be. If students are to learn from an activity, they should enjoy it. Use common names of plants with Year 8 students.



These exercises should help students to observe the plants and their inter-relationships more closely.

Use a binocular microscope from the laboratory and you will be amazed at the beauty that lies hidden in the least conspicuous flower.

### Tree Game

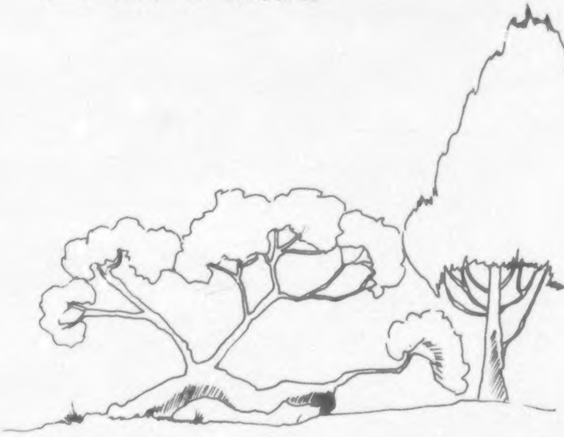
Make out *task cards* with *two or three* of the following items (or your own variation) on each card. Students to work in groups of three to complete a card, report their findings and collect another card. (Difficulty of the cards can be adjusted to suit the group.)

Look for:

- a tree with many trunks
- a tree with one straight trunk
- a tree with rough bark
- a tree with smooth bark
- a tree injured by animals
- a tree injured by a plant
- a tree with flowers
- a tree that has food for birds
- a tree that has a home for birds
- a tree with gumnuts on it
- a tree that has buds
- a tree with fruit and seeds
- a tree with peeling bark
- a tree with new red leaves

### Guess the Shape

Sketch the outline of a tree. Display all the outlines, and see who can identify all the other shapes. It may be as well to include large shrubs in this exercise. This is often a clear means of identification for students.



### Hunt the Plant

Make out task cards with two or three of the following on each card. Students to work in groups of four with two or three groups reporting back to each teacher. You might want them to make a drawing. The cards to have the following instructions:

*Hunt for* a different plant to fit each of these descriptions: (Do NOT pick or damage it in any way — just make a note of what you found and where you found it.)

- a plant growing in water or a moist place
- a plant that lives on another plant
- a plant growing in deep shade
- a plant which is splitting a rock
- a plant that smells like eucalyptus
- a plant with a flower smaller than a one cent piece

- a plant which does not belong
- a plant with gumnuts
- a plant with prickles
- a plant with a sticky or fuzzy stem
- a plant with a horn-shaped flower
- a plant with very shiny leaves
- a plant that smells musty
- a plant that grows under water
- a plant that has spores
- a plant with clover-shaped leaves
- a plant that eats insects

### Discover a Yellow Flower

Students will need a hand lens and access to a binocular microscope. Groups of no more than ten with a teacher. Look for as many different yellow flowers as you can find. *Group photographer* takes a close-up photo (get practice at school).

*Group recorders:* Share the work of recording details of flower appearance, smell, number of petals, are they joined, how big, etc. and of leaf structure, habitat, etc.

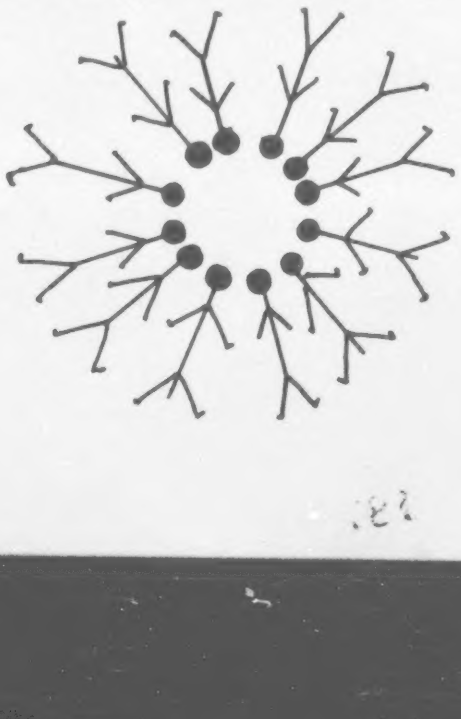
*Group artists:* Record plant by drawings.

*Explorers:* Seek out the next yellow flower for the group.

*Don't lose the fun of discovery in the effort to record.* Know your group and suit the intensity of the study to them. Have a *report back session* for the groups to compare findings. Display photos and details back at school.

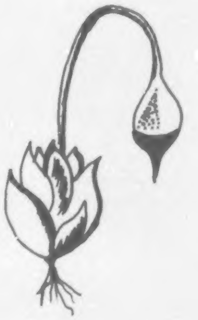
### Flower's Eye View

Find a grassy patch and lie down on your back with the rest of your group as though you are the petals of a daisy (heads to the centre of the daisy).



Get a look at the flowers of the world, forget your own problems and the people around you. What do you see and feel from your flower's eye view?

Creative writing or art work can follow from this exercise — see Creative section.

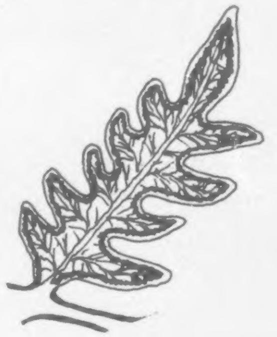


### Fun with Ferns and Mosses

To recognise major plant groups in the field and to gain an understanding of their habitats, students should have been introduced to ferns and mosses in the classroom. They need to know where to look for a capsule and spores in moss and where to look for the spore case in ferns. (Make sure you choose a time when there are spore cases under the fern leaf.)

### Looking Closely at a Fern

Draw one fern frond as seen with the naked eye.



Draw a close-up view of the underside of a fern frond as seen through the binocular microscope. It is not necessary to pick the fern if a second student holds the frond in place under the microscope. Take pains with this — spore cases are very impressive under the microscope.

### Finding Out About the Fern's Habitat

Choose a spot where there are lots of ferns and gently lie down near them (without damaging them!) with a blindfold over your eyes so that you can sense the atmosphere better. As soon as the blindfold is removed, write down adjectives or phrases that describe the feeling of the air about you and your own feeling of comfort. Then quickly move to a spot where there are no ferns and repeat the exercise describing what you feel either on paper, tape or to the rest of the group. What does your experience suggest about the kind of conditions favoured by ferns?

### Research

Find out why ferns like a particular habitat. Grow ferns in the classroom (for details of culture see O'Rourke, 1973).

### Looking for Fungi

The exercises aim to develop awareness of the diversity of life and through this to encourage a sense of wonder from which a real appreciation of the natural world can develop.

Students need to have their own set of simple fungi identification pictures (e.g. fungi families as in O'Rourke, 1973, 98-103). They also need to be able to use a hand lens or binocular microscope to examine the fungi in detail. If students work in threes, then you have an explorer, an artist and a recorder. (Warn against ANY picking.)

Draw up a table.

Share information from tables on large butcher paper. Do some fungi appear to be more common than others? Why? Share comments on smell and feel. Discuss the possible reasons for their occurrence on rotting material. Discuss why they are necessary in the ecosystem.

### Lichens, Mosses and Rock Succession

Show students moss and lichens in the classroom. Point out fruiting bodies.

In the field, when blindfolded, feel and smell the moss and lichen gently. Describe it and ask your partner to write down what you say. Do either of them remind you of anything? See if you can find any tiny animals that have made their home there.

### Looking for Fruiting Bodies

In groups of four, with a binocular microscope to each group, examine the moss and lichen on one rock to find fruiting bodies. Make drawings.

### Plants That Make Soil

Stay in your group and examine your rock. Is there soil under the lichens? Is there soil under the

| No. | Fungus Family (see O'Rourke) | Common Name if known | Fungus Family | Common Name | Drawing, Smell Feel |
|---|---|---|---|---|---|
| | | | | | |

moss? Examine any soil under the microscope for evidence of humus (broken down plant material). What do you think grew on the rock first and why? Do the other groups agree. What might grow after the lichens and moss?

**Patterning by Lichens and Moss**

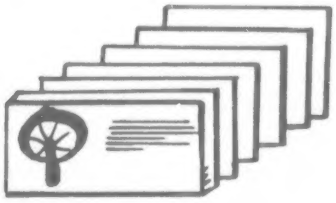
Make a drawing of one rock marking in the lichens, mosses and ferns as coloured patterns on the rock. Now throw a cup of water on some brown dry moss. What happens and why? Compare areas of brown moss with areas of green. How do the environments differ?

**Research**

How do lichens weather rocks? Find out more about lichens and how they consist of two types of plants.

**Make a Fungarium**

Make a set of cards from the drawings or photos of fungi you have taken in the Park. Use these cards to help you identify fungi next time you go to the Park. (Use 125 by 75 mm cards.)

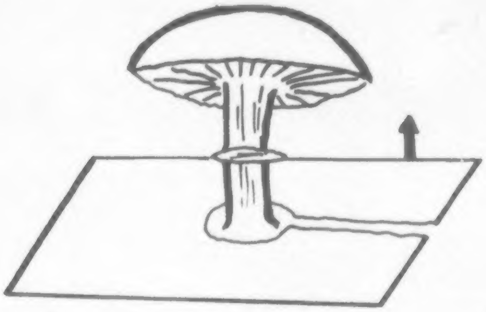


**Adventures of a Spore**

Imagine you are a fungal spore in a puffball or a mushroom. Someone has just kicked the puffball and you have been freed in the wind. Describe your adventures. Cut out a large fungus shape in coloured paper to record your adventures. Pin it up.

**Spore Patterns**

Back at school, buy a mushroom, support it on heavy card overnight. Use a layer of slow drying paste on the paper to collect the spores and place a plastic bag over the mushroom to prevent them blowing away.



**Creative Dance**

Pretend you are a tree in the breeze. Make up a dance to show what happens when the wind changes . . . still . . . slight breeze . . . boisterous . . . gusty. Pretend you are a tiny slater hiding under the rotting leaves. Crawl along as it does and tell how you feel. You are a leaf blown off in the wind. Move about as it does . . . and fall.

**Plant Eaters**

See the animal section for details of animal parasites. Evidence you might find: discolouration, pieces eaten out, skeletonising, eggs on the leaf.

**Plants Which Live on Other Plants**

Locate a tree which harbours several mistletoe plants. Explain parasite and partial parasite. Draw branch showing how the 'mistletoe' is attached. How does it get water and minerals? How does it get its sugars? Look for 'snotty gobbles', another plant parasite. Look for the little 'suckers' on its stem. What purpose might they serve? Talk about your findings.

**Bark Observation or Leaf Observation**

This is best done during the blindfold exercise. Work in pairs with one student blindfolded. Give the other student a card with the following questions and a tape recorder:

Describe how it feels. Describe how it smells.

Is it rough/smooth? thick/thin? peeling/smooth? wet/dry?

Finish the sentence — It feels like . . .

### Classifying the Bark

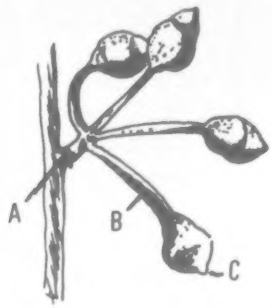
Pick out four different trees (with varying bark). Ask students to note colour, roughness, stringiness, depth of furrows in the bark. In groups share your information and decide how these trees could be divided into two groups on the information the students have brought forward. Repeat for each sub-group. Write out a simple key.

### Bark Rubbings

Each student makes two rubbings and attaches a number to each. Pin all rubbings on board and have a competition to associate the rubbings with the correct trees.

### Buds, Seeds and Fruits

Make cards using the pictures of buds and fruits in the Para Wirra Trees book (others will use drawings of their own gumnuts copied from their field sketches).



Students examine the buds and fruits on the trees in the Park against the card pictures. They can be given a task sheet:

Examine —

- how many buds are grouped together;
- is A long, is A flattened;
- is B long, is B flattened;
- is the operculum peaked (C);
- how long and wide is the bud;
- are the buds in the leaf axil or at the end of a stem?

### Seed Dispersal

Observe and draw or photograph as many different methods of seed dispersal as you can.

Look at the hygroscopic seeds of wild geranium in the paddock of misery farm (they curl and straighten depending on the moisture level of the seed). Is there a difference in size of seeds? Is there a difference in the number of seeds produced by different plants? Is there a difference in the number of seedlings produced by different plants?

Pretend you are the pod on a wattle that is drying out. As it dries more completely, it may curl or just crack finally throwing out the seed. Show the whole process in a creative dance.

### Studying 'My' Tree

O'Rourke (1973, 73) suggests that this is one topic where students might be engaged in a 'continuous study at the individual level'.

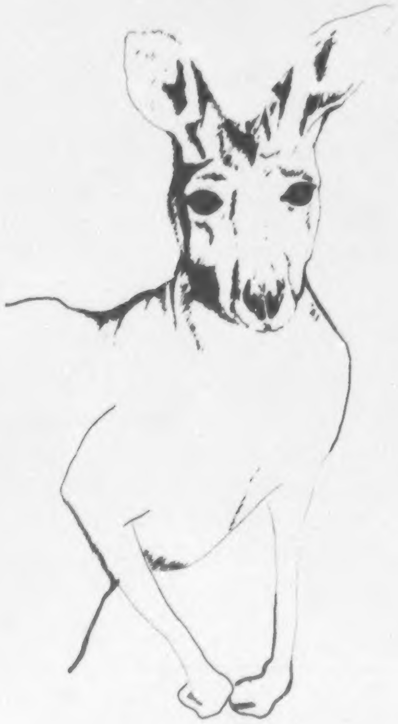
Seasonal and yearly growth in native trees is large enough to prove quite surprising and exciting to students over their five years in High School. Their 'own' tree in the Park can also become the place where they spend some time quietly in creative writing, drawing or reflecting. The table shown should be adapted to allow room for drawings and opportunity should be given for students to compare notes about their tree.

Photos can be taken at various stages, but these are most helpful if always taken from the one point.

| NAME | SEASON AND YEAR | WHERE FOUND (HABITAT) | SHAPE HEIGHT AND WIDTH | CHARACTERISTICS OF BARK, COLOUR, SMOOTH, ROUGH, PEELING | MEASUREMENT OF GIRTH | LEAVES: Shape, feeling of surface, position on twigs, distribution over plant | ROOTS: any root structures visible | FLOWERS AND FRUITS Shape, distribution, number | INTERESTING POINTS: Birds nesting in trees, evidence of any disease or damage or tree |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

## ANIMALS

*The kangaroo hopped fleetingly past, briefly gazing to both sides then increasing speed to reach its destination quickly.*



### The Kangaroo

- Observe during early morning or late afternoon. Sit quietly as they feed and make quick sketches.
- Show the students examples of Aboriginal art work, point out the x-ray effect in paintings.
- Make a large drawing of a kangaroo using line only, and including internal structures. Each section of the line drawing can now be decorated with patterns and line work. Use earth colours.

### Ant's Eye View — Bird's Eye View — Kangaroo's View

Painting or writing of this nature forces students to consider things from a different point of view and thus gives them more insight into the world of nature.

- Follow an ant for a while, looking closely at his environment with a magnifying glass.
- Consider people, birds, animals from the ant's point of view. Paint or describe what you saw as an ant.
- Climb to the top of a hill and take a bird's eye view. Your eyes will have wide peripheral vision and keen sight and you will see lots of detail.
- Kangaroos move quickly — what would they see?
- Find out about the eyes of other animals — ask the science staff to help.

### Follow That Ant!

Make a 'Lilliput' map of the ant's journey which you observed in the last exercise. Does it go over, under, or around obstacles in its path? Where does its journey end? Do other ants follow the same path?

### My Territory — Keep Out!

Some birds keep guard over their own territory and warn other birds to keep away.

- Watch the movements of some birds from a hiding place.
- Do they have one tree or bush where they spend most of the time?
- What happens if another bird comes near the tree? How is he told off?

Watch the birds in the late afternoon. As they prepare to settle down for the night, they usually let all the other birds in the area know that their tree is 'reserved' and others must keep away. This is called 'declaring their territory'.

### Birds Mural

During a bird watching session, students can collect information about as many different birds as possible — body shape, colouring, shapes of tail, head, beak, etc.

Back at the Centre discuss the types of birds observed. Each student could paint two or three or all the birds that they have observed.

A common theme is necessary to make the mural work effectively, e.g.

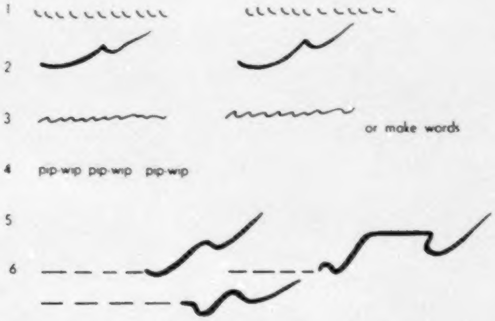
- birds in flight against a sky
- birds depicted in the tree tops flying amongst the branches.

The background setting for the birds should be drawn first and then the birds placed in this. Make sure students are working fairly large. Colour can either be restricted to natural colour or left to the students' imagination.

### Bird Calls

Very early morning is not such a good time for bird *watching*, there is not enough sun to see their colours — but it is a good time for *listening*. You will have to move very quietly. Find a good hiding place and be content to *wait and listen* preferably with your tape recorder and notebook.

Try writing down the sounds the birds make, inventing a symbol for each call.



### Colour in Birds

Describe the colour patterns of each bird you see in your field notebook:

- Note colour differences in the same species.
- Which sex has the brighter colours? (You will need help here.)
- What is the most common colour for birds?
- Do birds which stay high in the trees have brighter colours than those which feed near the ground?
- Of what advantage are dull or bright colours?

### Camouflage a Bird or Animal

Once students have tried to observe birds and animals, they will be well aware of their excellent camouflage. Make a painting of a bird or animal camouflaged:

- Draw a faint outline of the bird or animal and the foliage which surrounds him.
- Discuss ways in which the camouflage works (colour similarities, dappling effects of light, patterns on animals and birds).
- Painting can be in pointalist technique — applying the paint in daubs of colour.

### Daily Rhythms

Do all animals appear at the same time each day? Walk through the Park very early in the morning, at noon and in the late afternoon, following the same path to a hide near the creek. Note all the birds, insects, and other animals you see on the way and those you observe from your hide. Did you see the same ones on your walk or were they different? Did you see more at one time than another?

Choose a clearing on a hilltop and observe at three different times. Compare your observations with those made near the creek.

### Webs and Other Traps

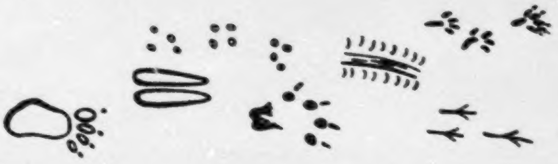
Many insects build webs to trap their food. How many different kinds can you find? You might see wheel webs, sheet webs, line webs. What have they caught? Watch for the owner and describe him in your notebook.

### Changes in Animal Populations

The natural community is continually changing with regard to number and type of animals present at any one time, e.g. kangaroos, rabbits. Determine a constant method of defining a particular area to be studied, e.g. permanent quadrat, certain tree, pool.

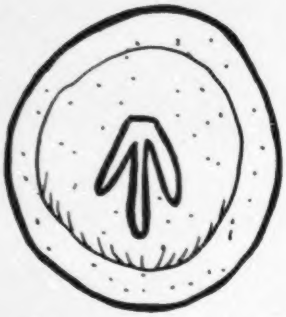
Collect data over a twelve month period: type of animal, number, date, time of day, temperature, humidity, weather patterns.

### Tracking



Most of the animals in the Park you won't *see*, but you *can find evidence of their presence*.

Look for soft, sandy or muddy places near the creek where they come to drink, or on the mud at the edge of a dam. Draw the tracks you see on paper with a thick pencil. Collect as many different ones as you can and keep them to identify later. Sandy patches in a dry, warm, sunny place may show tracks of lizards or beetles.



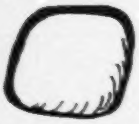
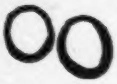
*DESIGNS* can be based on the lines and shapes of tracks you record. Use black and white and one colour only.

### Plaster Casts

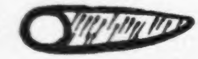
Make a wall of sand about 25mm high around print. Mix plaster of paris in a tin to form a thin smooth paste. Pour it gently into the side of your 'dam', onto a small piece of bark to avoid making a hole in the sand. When the track is filled, remove bark and allow 15-20 minutes for plaster to set. Gently lift, brush off sand.

### Droppings — Scats

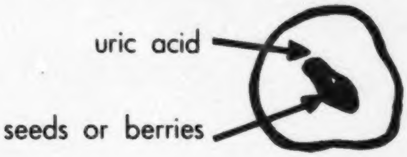
Animals leave droppings which are often easier to see than tracks. Examine several very dry droppings on white tile or icecream lid. Pull the dropping apart with dissecting arrow heads or strong twigs and examine fragments with a hand lens. Can you find seeds, berries, remains of leafy shoots, small insects or fragments of bones? Record:

| Dropping | Probable Animal From Which It Came | Food Remains Found |
|---|---|---|
|  | Kangaroo | |
|  | Rabbit | |

Kangaroo droppings are easy to find. They are about 25 mm in diameter, smooth and dark brown. If they are fresh, they are shiny. Lizard droppings have a white lump of uric acid at one end.

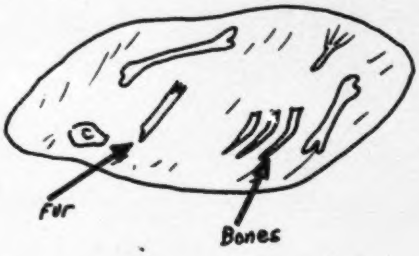


Bird droppings have uric acid all around the central piece of waste material.



### Casts

Owls leave 'casts' under the trees where they sleep. There are bundles of indigestible remains of the small animals they eat. Sometimes it is possible to tell which small animals the owl has eaten by examining the fur and bones which it rejects. Often it is the remains of a mouse!

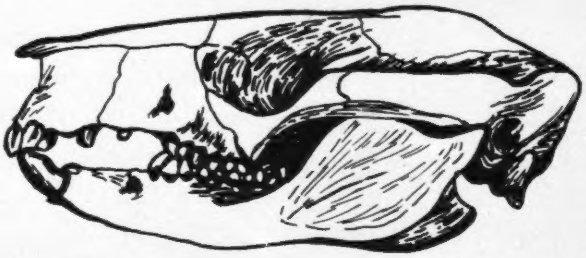


### Detective Work — Bones

If you search among rocks, in caves, or even in the hills, you may find a small heap of bones. How long does it take for them to become white? Search for evidence to tell you how long they have lain on the ground. Have small plants grown up between them? Has soil accumulated in the grooves?

### Which Animal?

Try to re-assemble the bones. How long is the backbone? Does it extend into a thin tail bone? Are the leg bones thick or thin? Are the front legs shorter than the back legs? Are there claws? How big is the skull?



Is the brain cavity large or small compared with the size of the skull? Are the eye cavities towards the front of the skull, or at the sides? Examine the teeth. Are these sharp and cutting or flat and grinding? Is there a beak? What shape is it?

Draw an outline of the animal you think died. Return the bones.

NOTE: Normally an activity of this kind would not be carried out in a national park.

### Living Places

Study several different living places and make a list of the animals you find in each one. The leafy tips of trees (look for webs or cocoons); under bark on a small tree trunk; under stones in damp soil; in water or clinging to stones in the creek; among rotting leaves at the base of a tree. How many little animals can you find? Use a hand lens and you may find even more!

Mark out an area with either a hoop or pegs and twine. Search the area for small animals. Make counts of organisms of the same species and note different species present. Describe the area — dampness, thickness of underground, temperature, shade. Which groups found the same animals? Why?

### Animals and Movement

Observe the movement of as many different animals as possible. Classify the mechanisms of movement:

- running
- hopping
- slithering
- swimming
- floating
- hitch hiking
- flying
- gliding

Research animals which move by a method not represented in the study area.

- Using a stop watch, time the movement of slow moving animals over a measured distance.
- Examine the mechanism of movement of an animal with more than one pair of legs. Illustrate. (Use a hand lens to watch small insects.) Observe movements of animals which, for humans, would be a superhuman effort.

### Animal Mime

Observe the movements of an animal. Decide, with the help of the teacher, which movements are easily mimed and typify the animal.

Mime the animal for the class and have them identify the organism.

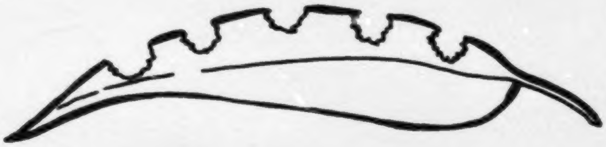
Discuss how it is that some movements can be mimed and others are too difficult for humans.

Are there things about the way the animal lives, eats, or about its predators that make it necessary to move in that way?

### Animals and Small Trees

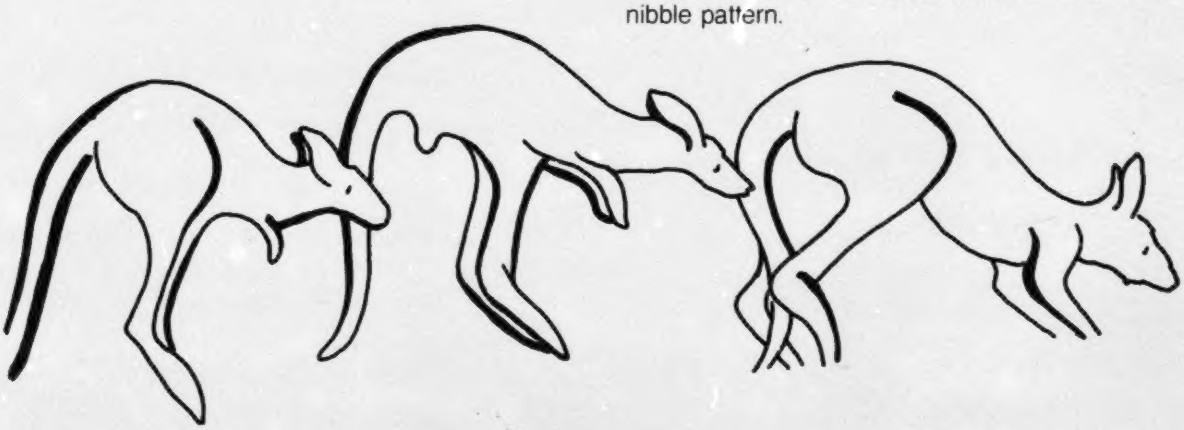
Observe trees from a distance to note activities of large animals, birds. Draw and describe animals found on the tree and the part of the tree where the organism was found. (A table may be provided here.)

Is there evidence to suggest the organisms feed on the tree (leaf damage)? What part of the tree houses most organisms? Suggest why. Are there any examples of egg cases, plant galls, chrysalids? Where are they situated? Suggest why.



### Nibblers!

Examine trees for chewed edges. Draw the pattern the nibbler has left on the edge of the leaf. How many nibble patterns can you find? Can you find the nibblers? Draw the nibbler, the leaf and the nibble pattern.



### Suckers!

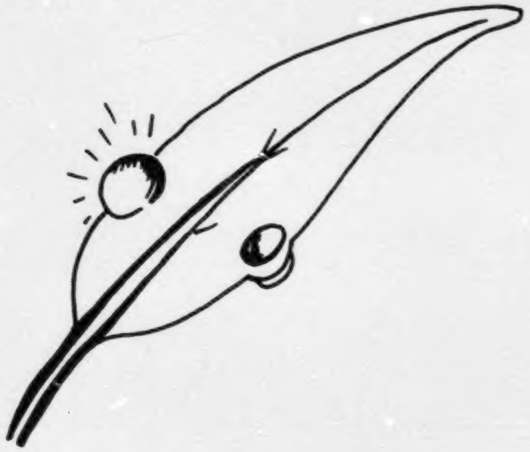
Some insects suck the juice from a plant stem. They have a proboscis, like a drinking straw, with which they pierce the stem and suck up plant juices. How many different 'suckers' can you find? Creep up to a butterfly on a flower. Watch it unroll its proboscis and insert it into the flower to suck up nectar.

### One Insect, One Tree

Some insects have favourite kinds of trees where they live. Some small, black, flying insects hang thickly in the clusters in the twigs of kangaroo thorn (*Acacia armata*) and on no other tree. What other examples of insect/plant associations can you find?

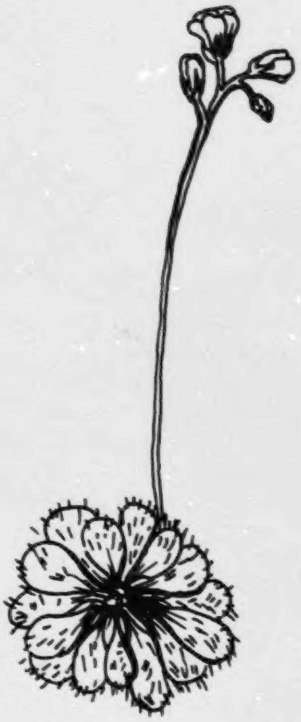
### Galls

A small wasp called a 'gall wasp' lays eggs in plant shoots or stems. This causes a swelling to develop called a 'gall'. Sometimes the presence of gall wasps causes strange, weird, new growth forms to develop in the tree or shrub. How many different galls can you find? Draw them.



### Plants Set Traps for Animals — Sundews

Two closely related plants in the Park set traps for insects. One is a small rosette of leaves on moist ground, often having a white flower. The other is long, twining, twisting around stems or grass for support. Look at photo number five. They both belong to the genus *DROSERA*. What do they catch? Look closely with a hand lens. How are the victims trapped? Find out WHY they need to trap animals.



## REFERENCES

A.S.E.P. (1974), *Life in Freshwater,* Australian Science Education Project, Melbourne.

O'Rourke, Brian T. (1973), *Life Science,* A.H. and A.W. Reed Ltd., Wellington.

Van Matre, Stevan (1974), *Acclimatizing,* American Camping Association, Bradford Woods, Martinsville, Indiana.

Wrightson, P. (1973), *The Nargun and the Stars* Hutchinson, Melbourne.

## ACKNOWLEDGEMENTS

Thanks are due to the 1975 booklet authors: Barbara Cock, Ken Cock, Pat Harbison, Ingrid Hay, Ken Hinkly, Chris Lawrence, Des Mau, Mark Rashleigh, Jeff Stratfold and Jean Whimp for permission to modify their material for this publication. Artwork is by Anne Nagel and Chris Lawrence and additional information on creative activities has been provided by Jim Dellit, Denise Gullidge and Callum McEachern. Reproduction of photographic material is the work of Parafield Gardens High School, photography Jean Whimp.